OCTOBER, 1933 NUMBER 286

THE UNIVERSITY OF NORTH CAROLINA RECORD

RESEARCH IN PROGRESS
JULY, 1932—JULY, 1933

GRADUATE SCHOOL SERIES No. 26

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FOREWORD

The present issue of Research in Progress is the thirteenth volume of this publication. It contains the record and the summary analysis of the research activities of the faculty and graduate students of the University of North Carolina for the year ending July 1, 1933. Tabulated reports are included of grants in aid of scholarly investigation from the Smith Research Fund, awarded by the Administrative Board of the Graduate School, and from the Rockefeller Fund for Research in Pure Science, administered by a committee of professors of scientific subjects. Following the policy adopted three years ago, Part I includes under sections devoted to departments or schools the data relating to research achievements and projects of faculty and students concerned, and Part II, in alphabetical order, the list of works of a popular or a more general nature. Abstracts of doctoral dissertations and masters' theses appear in Part I under the departments concerned. By reason of limitations as to space, these abstracts and other digestive analyses have been in drastic manner cut. It is hoped, however, that they may still give a fair and intelligible idea of what was accomplished.

W. W. Pierson, Jr., *Dean*

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APPROPRIATIONS GRANTED FROM THE SMITH RESEARCH FUND

PROJECT NO.	APPLICANT	SUBJECT	AMOUNT
193	MacNider, William deB.	For traveling expenses to Washington, Baltimore, and New York for study in libraries	$ 50.00
194	Pierson, W. W., Jr.	For traveling expenses to Washington, and for copying papers in the Library of Congress in connection with Henry Harrisse project	75.00
195	Boggs, Ralph S.	For obtaining photostat copies of two MSS in Spain dealing with a poem on Alphonso XI	25.00
196	Brooks, Lee M.	For expenses in carrying forward a study relating to the adoption of small children	50.00
197	Manning, John E.	For assistance in carrying on his study of education in Georgia prior to the Civil War	50.00
198	Wells, Mitchell P.	For assistance in defraying expenses of trip to London for work on dissertation	100.00
199	Swedenberg, Hugh T.	For assistance in defraying expenses of trip to London for work on dissertation	100.00
200	Garrett, M. B.	For purchase of a book in four volumes for use in preparation of dissertation of one of his students	20.00
201	Boggs, Ralph S.	For additional aid in collecting folklore in North Carolina	40.00
202	Hickerson, T. F.	For the purchase of a book to be used for research purposes	5.00
203	Johnson, W. H. E.	For consulting libraries in Columbus and Athens, Georgia	25.00
204	Prouty, W. F.	For purchase of slides to mount specimens of *foraminifera* for use of members of the department	25.00
205	MacKinney, L. C.	For photostating portions of Fulbert's letters	100.00
206	Smith, Wilburn P.	For transportation to Havana, Cuba, and return to aid him in his study of Jesus Castellanos, a Cuban writer	82.50
207	McCullough, Eugene F.	To secure typed copies of "Constitución de los Estados Unidos de Venezuela de 1864," necessary for completion of master's thesis	5.78
208	Russell, J. C.	For securing copies of documents in English libraries and for assistance in traveling expenses to England	75.00
209	Coffman, George R.	To purchase a rare book by T. Sharpe	17.20
210	Boggs, R. S.	Supplementary grant to Project No. 195	17.57
211	Williams, Arnold	For traveling expenses to Library of Congress and Harvard University Library in connection with his doctoral research	50.00
212	Bond, R. P.	For photostating several works of the eighteenth century in preparation of an edition of eighteenth century critical essays	100.00
213	MacKinney, L. C.	For transportation from New York to Paris and return to continue his studies on the correspondence of Fulbert and on Rieher of Rheims	150.00
214	Pierson, W. W., Jr.	To secure a copy of *Resúmen de la Geografía de Venezuela*	10.24

APPROPRIATIONS FROM THE ROCKEFELLER FUND FOR RESEARCH IN PURE SCIENCE, 1932-1933

APPLICANT	SUBJECT	AMOUNT
W. C. George	Part of travelling expenses to Woods Hole and Bermuda to make further comparative studies of blood.	$ 225.00
J. N. Couch	For employment of a part-time assistant during the summer for help in culturing fungi	150.00
Wm. deB. MacNider	For purchase of parts of the Barcroft-Warburg apparatus for determining the oxidizing capacity of various tissues and tissue juices	385.50
R. E. Coker	For employment of technical assistance in work on copepods and study of them under different conditions of temperature and nutrition	225.00
H. D. Crockford	For purchase of a conductivity bridge and parts for audio oscillator, to be used in study of the free energy of ionization and heat of ionization of certain organic acids	200.00
A. S. Wheeler and R. W. Bost	For assistance in the spectrographic study of numerous colored compounds	100.00
H. G. Baity	For purchase of a thermophone and species sampling apparatus for limnological work	225.00
T. F. Hickerson	For study of torsional restraints, i.e., the determination of factors expressing the relative torsional resistance exerted by structural beams of different sizes and shapes under various loading conditions; and for study of relation between bending moment and variations of moment of inertia in the members of a structural framework	70.00
H. M. Burlage and M. L. Jacobs	Equipment for study of volatile oils	603.00
Otto Stuhlman, Jr.	For manufacture of a "metal step diaphragm" to fit the Hilger E 1 spectograph	175.00
G. R. MacCarthy	To purchase a set of "U. S. Standard" sieves for research on beach sands and other sediments	60.00
J. G. Douglas	For detailed faunal and stratigraphic study of the Silurian System of the southeastern states	300.00
J. W. Lasley	For purchase of the following: Darboux, G.: *Mémoires de Mathématiques*	90.00
W. F. Prouty	For traveling expenses of three people to study the "bays" between Myrtle Beach, S. C., and Wilmington, N. C., in an effort to determine whether or not these bays represent meteor scars; and for purchase of a new attachment for magnetometer for use in the above study	340.00
H. V. Wilson	For travel and living expenses of an assistant at U. S. Fisheries at Beaufort, N. C., for the study of the embryology and cellular biology of sponges; and for purchase of some reagents and small apparatus	150.00
E. K. Plyler	For purchase of equipment for study of interference, especially of light from two sources, as follows: 2 mercury arcs, 2 micrometer holders, 2 slits, and one half-silvered glass plate	325.00
Otto Stuhlman, Jr.	For purchase of parts to build a power supply unit to deliver 2,000 volt potention and .5 ampere; and for oscillator unit	350.00
J. F. Dashiell	Material for study of problem of reliability of individuals in observing and testifying	100.00
H. D. Crockford	For purchase of a special solution balance for use in work on the electro-chemistry of dilute solutions	304.56
W. C. Coker and H. R. Totten	For expense in making a collecting trip through several of the southeastern states	200.00
Wm. deB. MacNider	For the assistance of a technician in sectioning the kidneys of lung fish	35.00
H. M. Burlage and M. L. Jacobs	Part of the purchase price of a Bausch and Lomb polariscope	300.00
J. N. Couch	For assistance in culture work with *Dictyuchus* and *Septobasidium*	86.94
	TOTAL	$5,000.00

Part I

RESEARCH IN PROGRESS

DEPARTMENT OF ANATOMY

W. C. George presented the following paper before the Elisha Mitchell Scientific Society, February 14, 1933:

Some Phenomena of Self Adjustment in Ascidians.

For abstract see *Journal of the Elisha Mitchell Scientific Society*, XLIX: 38. 1933.

DEPARTMENT OF BOTANY

W. C. Coker and H. R. Totten have been engaged in work in the field and in the laboratory on their book, Trees of the Southeastern States. This work, containing about 200 original illustrations, will be published by the University of North Carolina Press in March, 1934.

John N. Couch has published:

The Development of the Sexual Organs in *Leptolegnia caudata*. *American Journal of Botany*, XIX: 584. 1932.

Gametogenesis in *Vaucheria*. *The Botanical Gazette*, XCIV: 272. 1932.

For abstracts see *Research in Progress*, December, 1932.

The following paper was presented before the Mycological Society of America, Atlantic City, Dec. 29, 1932:

The Life Histories of Some Peculiar Lower Phycomycetes.

A new fungus parasitic on *Pythium* and two new fungi parasitic on *Stigeoclonium* were described, including cytological details.

Work on the monograph of *Septobasidium* is being continued.

(With Mary Linda Vardell.) Experimental studies on sexuality in *Dictyuchus* have been continued.

The following master's thesis was accepted by the Department during the year:

Mary Linda Vardell. Seed Development in *Spigelia marilandica*. (Under the direction of W. C. Coker.)

The seed development of *Spigelia marilandica* L. *(Loganiaceae)* is like that of other members of the genus described by Dahlgren. The ovules are amphitropous and have a small nucellus, which disintegrates early, and one thick integument. The basal megaspore of a longitudinal row of four develops into an 8-nucleate embryo sac. The antipodals degenerate very early. The synergids are pear-shaped. About 700 free endosperm nuclei are formed before formation of cell walls. A short pro-embryo is formed by transverse divisions of the fertilized egg, and from its apical cell the embryo proper develops. The mature suspensor is a single row of 8-10 cells. Lamellae of thick-walled cells are formed in the outer part of the integument, connecting with the epidermis whose inner walls are thickened. The extensive cellular endosperm grows out between these lamellae, displacing the unchanged integumental tissue between them and thus becoming ruminated.

DEPARTMENT OF CHEMISTRY

JAMES M. BELL is studying the separation of hafnium from zirconium by several fractional crystallization methods.

A. S. WHEELER directed the following researches:

THOMAS L. KING (Doctoral dissertation.) The Nitration of 2, 6-Dibromo-1, 5-dihydroxynaphthalene.

2, 6-Dibromo-1, 5-dihydroxynaphthalene was acetylated and the acetyl derivative was added to fuming nitric acid at -5° to -15°. The nitrated product was precipitated with ice water. Analysis showed that one bromine was eliminated and two nitro groups were introduced: 6-Bromo-4, 6-dinitro-1-acetoxy-5-hydroxynaphthalene (B), lemon yellow needles. The sodium, potassium, and silver salts were prepared. They are orange to red compounds. Hydrolysis substituted OH for the acetyl group. Product, yellow needles. A polygenetic dye. It gave good dyeings on wool, silk, and rayon, using mordants as zinc, aluminum, and copper acetates and tannic acid. B yielded a monobenzoate and a diacetate. D with sodium hydroxide gave a dihydroxy compound. The latter gave a benzoate. In accord with orientation rules and the fact that one Br atom was eliminated, the nitro groups were placed in positions 4 and 6.

PROFESSOR WHEELER is directing the following work in progress:

J. N. LECONTE. (Progress on doctoral dissertation.) Quinolines Derived from 2-Amino-p-cymene.

A mixture of aminocymene and nitrocymene was subjected to Cohn and Gustavson's synthetic process for making quinolines. Product, 5-osipropyl-8-methylquinoline, a yellow oil; b. 230°-232° at 190 mm. Cooled by ice, it solidifies. The condensation of aminocymene with paraldehyde gave cymylquinaldine, colorless plates, b. 179° at 35 mm. Picrates and other derivatives of these compounds have been prepared.

A. P. Sledd. (Progress on doctoral dissertation.) The Fittig Condensation Applied to 2-Bromo-p-cymene with Aliphatic Bromides.

Some important observations have been made since the last report.

J. Milton Early. (Master's thesis.) The Chlorination of 2-Nitro-p-cymene.

Chlorination of 2-nitro-p-cymene with iron powder as catalyst gave first 6-chloro-2-nitro-p-cymene, bright yellow oil, b. 123°-125° at 6-7 mm. Density: d_4^{20} 1.1965. Index of Refraction: n_D^{26} 1.4934. Reduction with tin-zinc and hydrochloric acid gave the amine, 6-chloro-2-amino-p-cymene, a light yellow oil, b. 130°-132° at 7-8 mm. Density: d_4^{20} 1.0968. Index of Refraction: n_D^{24} 1.5583. Its hydrochloride, white crystals, easily hydrolyzed by cold water. A second atom of chlorine was introduced into nitrocymene by further passage of chlorine, giving 5, 6-dichloro-2-nitro-p-cymene, a bright yellow oil, b. 136°-138° at 4-5 mm. Density: d_4^{20} 1.3051. Index of Refraction: n_D^{26} 1.5515. This nitro compound was reduced with difficulty. The acetyl derivative and hydrochloride of the amine were prepared.

G. C. Kyker. (Progress on master's thesis.) A Study of 2, 5-Cymo-p-quinone.

Cymoquinone was obtained by coupling 2-amino-p-cymene with diazotized sulfanilic acid. The product was reduced to the diamine and the latter oxidized to the quinone. Bromination under various conditions has so far yielded a dibromo derivative and a high melting tetrabromo derivative. Constitutional studies are in progress.

Frank K. Cameron has directed the following research:

E. W. Constable. (Progress on doctoral dissertation.) Equilibria in the System: Ferric Sulfate, Hydrogen Sulfate, and Water.

A study of the composition of liquid and solid phases at equilibria in aqueous systems of ferric sulfate containing excess of sulfuric acid. Meta stable conditions are common, persistent, and difficult of control. Colloid dispersions are common. Mechanical separations by ultra-filtration are being studied.

W. H. Baskerville. (Progress on master's thesis.) Solid Solutions of Ferric Sulfate and Hydrogen Sulfate.

A study of equilibria between solid solutions and liquid solutions in aqueous ferric solutions, and a study of the former by X-ray methods.

B. L. Johnson. (Doctoral dissertation.) A Study of the Aging of Rubber.

With oven aging, rubber is depolymerized; with natural aging, it is polymerized. In either case it deteriorates, hence shift of polymers in quasi-equilibria is not the predominant factor in deterioration. Delay in appearance of X-ray crystalline patterns in aged rubber can be explained by concentration of lower polymers, expelled after aging. There seems to be the same depo-

lymerization with and without an anti-oxidant, hence other factors than shift in polymers affect decrease in tensile strength. Position and width of diffraction lines remaining the same indicate that decrease in intensity is due to smaller number of crystal aggregates of C_5H_8 molecules rather than variation in size of a constant number of these aggregates. This investigation was made possible by a grant from Southern Webbing Mills, Inc., and Joyce-Venning Manufacturing Company, through L. W. Joyce, president of both organizations.

J. P. SANDERS. The Unit Cell of Cellulose in Cotton Stalks and Cusps.

It has been shown that in composition and structure of the unit cell the cellulose of cotton stalks and cusps is identical with the cellulose of lint and commercial pulp woods. Identical products result from chemical treatments.

J. P. SANDERS and E. G. EGAN. Comparison of Cellulose Recovery from Cotton and Tree Woods.

It has been shown that practically the same consumption of chemicals is required in pulping cotton stalks and cusps as for commercial woods. Consumption of chlorine in bleaching is much less. The stalks and cusps yield about two-thirds as much mercerized cellulose as does spruce wood; whole cotton, lint, stalk, and cusps yield rather more.

J. T. DOBBINS has directed the following research:

JACOB ADDLESTONE. (Doctoral dissertation.) A Study of the Soda-Alum System.

The system sodium sulfate-aluminum sulfate-water has been investigated at zero, 30° C., and 42° C. There is no formation of the alum at zero, the solid phases being $Na_2SO_4 \cdot 10\,H_2O$ and $Al_2(SO_4)_3 \cdot 18\,H_2O$. The alum exists at 30° C. between the limits of concentration 26% Na_2SO_4 and 11% $Al_2(SO_4)_3$, and 3% Na_2SO_4 and 30% $Al_2(SO_4)_3$. Above 30° C. hydrolysis takes place to some extent, so that the method of tie-lines is not satisfactory for the determination of the solid phases. By use of the tell-tale method and by photomicrographs, it was shown that the alum exists at 42° C. between the limits of concentration 26% Na_2SO_4 and 13% $Al_2(SO_4)_3$, and 2% Na_2SO_4 and 32% $Al_2(SO_4)_3$.

LAURA CORBETT THOMAS. (Master's thesis.) A Volumetric Determination of Sulfate Using Organic Reagents.

The volumetric determination of sulfate using benzidine hydrochloride as a precipitating agent has been found to be unreliable due to the wide variation in the weight of the sample, in the volume of the reagent used, in the volume to which the solution is made before filtration, or to the time allowed before filtration after the sulfate is precipitated.

F. H. EDMISTER is engaged in a study of the systems:

1. $CaO\text{-}S\text{-}H_2O$.
2. $CaSO_4\text{-}Al_2(SO_4)_3\text{-}H_2O$.

H. D. CROCKFORD has directed the following research:

T. B. DOUGLAS. (Progress on doctoral dissertation.) The Free Energy of Ionization of Some Organic Sulfur Acids.

Conductivity studies are being made for the purpose of obtaining data for the calculation of free energies of ionization.

D. J. BRAWLEY. (Progress on doctoral dissertation.) The System: H_2SO_4-$PbSO_4$-PbO_2-H_2O.

This work is being done in collaboration with the Naval Research Laboratory at Washington and is made possible through a fellowship supported by the Federal Government. Equilibrium studies are being made in the above system with the view of obtaining the solubility relationships in lead-acid storage cells. The 0°, 25°, and 50° isotherms have been completed.

D. J. BRAWLEY. (Master's thesis.) The System: $CuSO_4$-$CoSO_4$-H_2O.

The system was studied at 0° and 25° C. The isothermal solubility curves were determined, and the compositions of all the solid phases involved were definitely established. The results are presented in tables and phase diagrams.

J. C. LOFTIN. (Master's thesis.) The Decomposition Potentials of Certain Fluorides.

The decomposition potentials of NaF, KF, NH_4F, and H_2F_2 have been determined at various temperatures and concentrations. Increases in temperature or concentration cause a decrease in the decomposition potentials.

N. L. SIMMONS, JR. The Activity of Sulfuric Acid in Aqueous Ammonium Sulfate Solutions.

EMF measurements have been made at 25° C. in .1 and 1 N sulfuric acid solutions with varying amounts of ammonium sulfate. From these measurements the activities of the acid have been calculated.

T. S. WATSON. The Systems: $CoSO_4$-K_2SO_4-H_2O and $CoSO_4$-Na_2SO_4-H_2O at 0°C.

Solubility relationships in the above systems at 0° C. have been determined.

E. C. POWELL. The Systems: Benzene-p-Nitrotoluene and Benzene-o-Nitrotoluene.

Temperature-composition diagrams for the above have been determined. From these the latent heats of fusion have been calculated.

F. W. GRANT. The Heat of Solution of Solid Solutions of $CuSO_4$ in $CoSo_4 \cdot 7\ H_2O$.

Heats of solution have been measured at 25° C. for the series of solid solutions formed by the above.

PROFESSOR CROCKFORD has continued his work with the Naval Research Laboratory at Washington on the problem of the handling of

gases from storage batteries. Most of the work is done at Washington, but part has been carried on at Chapel Hill. This work is in general of a secret nature and therefore cannot be included in *Research in Progress.*

RALPH W. BOST has published during the year:

R. W. BOST and H. R. BAKER. Some Reactions of Tetra-para-tolyl Tin. *Journal of the American Chemical Society,* LV: 1112. 1933.

R. W. BOST and M. W. CONN. Behavior of Trimethylene Sulfide in Heptane and Naphtha Solutions. *Industrial and Engineering Chemistry,* XXV: 526. 1933.

R. W. BOST and M. W. CONN. The Synthesis of Trimethylene, Tetramethylene, Pentamethylene, and Alpha-Methyl-Pentamethylene Sulfides. *Oil and Gas Journal,* XXXII: 3:17. 1933.

PROFESSOR BOST has directed the following research:

R. H. BELCHER. (Progress on doctoral dissertation.) The Separation and Identification of Sulfides, Sulfoxides, and Sulfones.

About twenty-five sulfides representing the alkyl, the alkyl-aryl sulfides have been studied under various conditions with mercuric chloride. The studies were carried out in hydrocarbon, acetone, and alcoholic solutions respectively. A method for their differentiation has been proposed. Studies on the corresponding sulfoxides and sulfones are now under way.

J. O. TURNER. (Progress on doctoral dissertation.) The Separation and Identification of Mercaptans and Disulfides.

Thirty-six mercaptans, representing all the important radicals attached to the sulfhydryl group, have been studied with 2, 4-dinitro-chlorobenzene. All gave solid derivatives, consisting of golden yellow needles, with sharp melting points. Sulfones of definite melting points were obtained by the action of potassium permanganate on the sulfides. The mercaptans were converted almost quantitatively into disulfides by iodine. The disulfides have been characterized.

G. J. DAVIDSE. (Progress on master's thesis.) New Dyes of the Magenta Series from 4-Amino Diphenyl.

Diphenyl, an inexpensive chemical, was converted into 4-amino diphenyl by a suitable process which can be used to prepare the latter in quantity. 4-Amino diphenyl has been condensed with various amines. Dyes of the magenta series have been prepared. These dyes are now being tested.

DAN FORE. (Progress on master's thesis.) Some Constituents of *Melia Azedarach.*

When 1,581 grams of finely ground berries were extracted with petroleum ether, 45.8 grams of yellow oil were obtained. A white fat was obtained from

the latter upon cooling. Glucose has been positively identified as a constituent. Traces of a poisonous principle, picrotoxin, have been identified both by chemical and physiological tests. The oil is now under investigation.

R. E. Gee. (Progress on master's thesis.) The Action of 2, 4-Dinitrochlorobenzene on Sodium Alcoholates.

2, 4-Dinitrochlorobenzene in alcohol was allowed to react with the sodium alcoholate in alcoholic solution. The corresponding 2, 4-dinitrophenyl ether was obtained. The 2, 4-dinitrophenyl ethers were white solids, highly crystalline, but their melting points were all within a few degrees' range and hence are not suitable derivatives for identifying alcohols.

Lorenzo Johnson. (Progress on master's thesis.) Some New Thioethers from Diphenyl Mercaptan.

Thioethers from methyl through butyl have been prepared by the action of sodium diphenyl mercaptide on the corresponding alkyl halide. The thioethers are now being studied with bromine, mercuric chloride, oxidizing agents, and methyl iodide.

Charles F. Wilkinson. (Progress on master's thesis.) The Hydrogenation of Substituted Ethylenes.

Various unsymmetrical ethylenes were prepared by the action of an aryl magnesium halide on ethyl acetate followed by hydrolysis to the carbinol and then by pyrrolysis to the substituted ethylene. Thus far, the ortho-, meta-, and para- γ, γ-ditolyl ethylenes have been prepared.

Henry Weiland, Jr. Hydrogenation of Ethylenic Compounds.

Phenylethylene, γ, γ-diphenylethylene, sym-diphenylethylene, tetraphenylethylene and dibiphenylene-ethylene were prepared, and the effect of each group on the activity of the double bond towards hydrogen was studied. The degree of activity was found to be in the order of the compounds given above.

A. M. White has published:

Studies in Agitation. I: The Suspension of Sand in Water. *Industrial and Engineering Chemistry,* XXIV: 1160. 1932. With S. D. Sumerford, E. O. Bryant, and B. E. Luken.)

Professor White has had the following papers accepted for publication:

Studies in Agitation. II: Sand Concentration as a Function of Sand Size. *Industrial and Engineering Chemistry,* XXV: 1025. 1933. (With S. D. Sumerford.)

The System Ferrous Sulfate-Manganous Sulfate-Water at 0° and 25°C. *Journal of the American Chemical Society,* LV: 3182. 1933.

Studies in Textile Wastes. (With H. F. Chrisco and H. G. Baity.)

He has directed the following research:

E. BRENNER, M. S. MORRISON, and G. A. PHILLIPS have studied the effect of stirrer design on the power demanded for agitation.

T. R. TAYLOR and L. C. SURPRENANT have studied the pressure drop in a packed tower through which air is flowing countercurrent to a descending liquid stream.

The following master's theses have been completed under his direction:

HOWARD F. CHRISCO. Studies in the Treatment of Textile Wastes.

A study of twenty-nine North Carolina textile wastes has been made with a view to complete elimination of the color by chemical treatment. The quantities of various common reagents necessary to effect this decolorization are given, these amounts being higher than those commonly used commercially because of the high standard of color removal imposed on the present work. The reagent ferrous sulfate in conjunction with lime produces the satisfactory decolorization of most of the wastes studied. The quantity of reagent necessary to clarify a mixed waste is approximately the sum of the amounts necessary to treat each waste separately.

S. D. SUMERFORD. Studies in Agitation: The Suspension of Sand in Water.

A study was made of the distribution during agitation of insoluble particles in water. A 500-gallon cylindrical tank equipped with a paddle agitator was used. Samples were taken at intervals, both vertically and from the center to the outside of the tank. Results were shown graphically.

Conclusions of the study were that maximum suspension is rapidly effected, but uniformity of concentration is never attained; there is greater uniformity of concentration when the paddle is near the surface of the liquid, but there is greater concentration of suspended matter when the paddle is in lower positions; due to varying velocities, there is an hydraulic sizing of particles throughout the liquid; and sand concentration does not indicate stream flow, but is a function of the velocity of the liquid.

DEPARTMENT OF CLASSICS

G. A. HARRER has published:

Inscriptions of Legati in Syria. *American Journal of Archaeology,* XXXVI: 3: 287-289. 1932.

These notes deal with several governors of Syria. P. Valerius Patruinus is found by a new military diploma to have been governor in 88 A.D., perhaps as successor to T. Atilius Rufus. Iulius Saturninus is now definitely dated as governor in 185-6 or 186-7, and not in the third century. Manilius Fuscus is proved to be the first governor of Syria Phoenice. New evidence

permits the emending of an inscription by which Venidius Rufus had been incorrectly given that honor. Rutilius Pudens Crispinus is fixed as governor of Syria Phoenice about the year 230.

Professor Harrer has in preparation:

The Copying of Military Diplomas.

J. Penrose Harland is continuing the assembling of material for a work on the Helladic Civilization.

The following doctoral dissertation was completed during the year under the supervision of the Department:

Van Courtlandt Elliott. Roman Senators in the Time of Hadrian and Antoninus Pius. (Under the direction of G. A. Harrer.)

This dissertation continues the work of Bruno Stech, *Senatores Romani qui fuerint inde a Vespasiano usque ad Traiani.* (Leipzig, 1912.) The study is arranged in four lists. 1. The Senators of the Age of Hadrian. 2. The Senators of the Age of Antoninus Pius. The last two lists are supplementary. 3. The Senators of both the reigns of Hadrian and Antoninus Pius. 4. Unknown—i.e., a list of inscriptions of the Senatorial order of the time of Hadrian and Antoninus Pius which cannot be identified as to name.

For the reign of Hadrian 317 names are listed. For the reign of Antoninus Pius 324. There are 124 names for both the reigns of Hadrian and Antoninus Pius. The introduction, which discusses the sources and the method, also compares the number of Senators in this list with the number for the reign of Trajan (428) as found in Stech. The author suggests, with evidence, that the lack of literary material and the decrease in epigraphical material after the time of Trajan account for the disparity of numbers between Stech and this study.

It is also noticed that an examination of a selected number of papyri collections reveals that such material is of no significance for the names of Senators.

The following master's theses were completed during the year under the supervision of the Department:

Laura Edwina Ford. The Women of the *Æneid.* (Under the direction of George Howe.)

This thesis presents a complete catalogue of all women characters of the *Æneid,* with the exception of Dido and the divine characters, together with a study of the material connected with each for purposes of determining the poet's methods of portrayal.

Virginia Cofer Martin. Certain Features of Catullus' Style in the First Sixty Poems. (Under the direction of George Howe.)

The special object of study in this thesis is the poet's method of expanding an idea either within the compass of a single poem or through a return to the

same subject in a separate poem. Eight varieties of method are discovered, each of which has been analyzed for itself; a summary considers the several varieties together in respect to such matters as interrelations and frequency.

The following studies have been undertaken by candidates for advanced degrees:

LILLIAN DORN. Omens in Lucan's *Pharsalia.* (For the master's degree.)

JEWEL E. GODWIN. The Younger Pliny's Literary Relations. (For the master's degree..)

LESSIE B. PHILLIPS. Character Sketches in Sallust. (For the master's degree.)

FRANCES STANSELL. The Role of Anna in Vergil and Ovid. (For the master's degree.)

ALBERT I. SUSKIN. The Arrangement of Material in Livy. (For the doctor's degree.)

EVELYN WAY. Seneca's Influence on Later Historians of Rome. (For the doctor's degree.)

LILY MAE WERTZ. Comparison of Certain Features in the *Culex* and *Æneid VI.* (For the master's degree.)

ELIZABETH WHITE. Seneca and Suetonius on the Reigns of Caligula and Claudius. (For the master's degree.)

MARY CATHERINE WILLIAMS. A Study of Transitions in Suetonius. (For the master's degree.)

DEPARTMENT OF ECONOMICS AND SCHOOL OF COMMERCE

C. T. MURCHISON has completed the following studies:

Requisites of Stabilization in the Cotton Textile Industry. Read before the American Economic Association, Dec. 28, 1932. Published in the *Proceedings* of the annual meeting of the American Economic Association; March Supplement of the *American Economic Review,* March, 1933.

The Incidence of the Depression in the South. Read before the Conference on the Economic Status of the Negro sponsored by the Julius Rosenwald Fund. Washington. May 11, 1933.

PROFESSOR MURCHISON has the following work in progress:

The Roles of Individual Industries in Business Cycle Causation.

An analysis of the major manufacturing and extractive industries of the United States to ascertain the part played by each as a contributing or stabilizing factor in business fluctuations. To be published as a book in the winter of 1933-34.

E. W. Zimmerman has published during the year:

Natural Resources. Article in the *Enclopedia of the Social Sciences.* The Macmillan Company. 1933.

Resources are the environment in the service of man. What nature can give depends on man's ability to take or willingness to receive. Viewed in that light, resources are purely relative and functional concepts. Their availability depends on the development of human wants, the establishment of social objectives, the state of the arts—material as well as institutional—and on population trends. Since the mechanical revolution, energy rather than land must be viewed as the strategic focal point of the resource set-up. There are two major resource patterns: the ancient pattern of vegetable civilization and the modern pattern of machine civilization. Many of the problems which the world is facing today result from the incomplete adjustment of these two patterns. The mechanical revolution has given rise to a structural and functional arrangement of world resources which resembles a hierarchy rather than a competitive market. This shift in world resources calls for a reappraisal of essential features of economic theory.

World Resources and Industries. A Functional Appraisal of the Availability of Agricultural and Industrial Resources. xix, 843, numerous maps, graphs, diagrams, half-tones, etc. New York and London: Harper and Brothers. 1933.

This book has resulted from a study and a teaching experience extending over a period of at least fifteen years. Its aim as a textbook is to bridge a gap which at present exists between economic geography and economics, and to vitalize the study of economics by means of a new synthesis between cultural geography and economic thought. Its objective, furthermore, is to broaden the factual basis on which the structure of economic thought rests and thus to combat empiricism. In order to attain this end, the attention is focused on functional relationships between nature and culture, human wants, social objectives, and the arts—technological and societal—etc. The environment is treated not as a static background but as a living organism, an endless succession of kaleidoscopic patterns evolving in response to constantly changing wants and arts.

The first part, "Background and Perspectives," covering about 150 pages, lays the foundation—historical, geographical, and cultural—so necessary for a proper appreciation of the discussions which follow. From the very start the relativity and the functional nature of resources are stressed as they develop from constantly changing want patterns, dimly conceived social objectives, and dynamic arts. Energy dominates the scene, determining the manner of land utilization, the size, shape, and architecture of the cultural superstructure which man can raise on the foundation of his natural environment, vitally affecting even man's attitude toward population increase and hence the all-important man-land ratio. In this discussion the shift from a one-sided reliance on muscular energy to an increased dependence on machine power is

of strategic importance. It dictates the entire layout of the body of the book, for it reveals that the world of resources is made up of two major patterns or categories: the ancient culture pattern of animate energy, of organic substance (of agricultural or vegetable civilization) on the one hand, and the modern culture pattern of inanimate energy, of metals (of industrial or machine civilization) on the other.

Part two traces the fate of agriculture or vegetable civilization under the impact of machine industry. We see two animals of different build and temperament harnessed to the same yoke of profit economy with disastrous consequences. The emphasis throughout is not on detail—technical, economic, geographical—but on historical perspectives, on broad vistas and distant horizons. The ultimate objective of the whole is rather to promote a better understanding of our times, our civilization, and its problems than to hand out bits of information of a vocational nature and of immediate use in the practice of some business or profession.

Among new departures from traditional presentation of the subject matter which may prove of some interest to research students the following might be mentioned: the emphasis on energy rather than land as the key to the modern resource pattern (Chapters 4 and 5); the distinction between "pure agriculture" and "pure industry" (Chapters 11 and 12); a theoretical treatment of perennials as distinguished from annuals (Chapter 21); the distinction between economy, conservancy, and conservation (Chapter 39).

Resources of the South. *South Atlantic Quarterly,* July, 1933.

Under an economic system marked by the free movement of production agents, economic regionalism can at best possess only supplementary significance. While in such fields as sociology and geography regional studies hold out great promise, their usefulness to economic research is more limited. In particular, the mobility of capital which leads to absentee ownership of basic natural resources renders largely illusory for economic study the concept of regional resources as developed along geographical and sociological lines.

PROFESSOR ZIMMERMAN has in preparation:

Wood Industries. Article in the *Encyclopaedia of the Social Sciences.* The Macmillan Company. 1934.

He is directing the following dissertations:

FRED ARNOLD. An Analysis of Farm Relief Measures in the United States.

M. O. PHILLIPS. The Rise and Decline of the "Tramp" in World Shipping.

G. T. SCHWENNING was granted leave of absence on the Kenan Foundation for the fall quarter, 1932, and was awarded a Grant-in-Aid by the Social Science Research Council to enable him to continue his preparation of a book on The Dismissal Wage. He was abroad several

months doing field work on the subject in England and France and studying in the library of the International Labor Office at Geneva.

The proposed volume consists of (1) a discussion of the nature and extent of dismissal wage payment plans adopted voluntarily in Europe, in Japan, and in the United States; (2) a summary and an analysis of dismissal wage laws enacted in approximately fifty countries; and (3) an evaluation of this new development in industrial relations.

He has completed the editing of a book on Trends in Management to which he contributed a chapter dealing with Employment Termination Allowances. It is expected that this book will be published in the fall of 1933.

The book consists of a series of lectures on significant new developments and practices in the field of business management.

He has completed the following articles which have been accepted for early publication in *Industrial Relations*:

British Dismissal Gratuities.

Continental European Dismissal Wage Plans.

British Law Regulating the Termination of Labor Contracts.

He has published during the year:

Discharge Indemnity for Japanese Workers. *American Federationist,* October, 1932. This article was reprinted in *Industrial Relations,* November-December, 1932.

Professor Schwenning is directing the following research:

J. P. Littlejohn. (Master's thesis.) The Influence of Technological Developments on Power Rates.

John B. Woosley is continuing his studies in the state taxation of banks.

The following theses are in process under the direction of Professor Woosley:

Clarence C. Cates. An Analysis of Recent Blue Sky Legislation.

Lyles G. McNairy. The Effects of Changes in the National Banking Code on the Relative Position of the National Banking System, 1900-1927.

Charles J. Shohan. Capital Issues of Department Stores, 1927-1929.

C. P. Spruill, Jr., is continuing his work on a History of the Finances of the State of North Carolina since 1860.

MALCOLM D. TAYLOR was on leave of absence with the Federal Trade Commission June, 1931, to September, 1932. He wrote the Commission's report on Chain Store Private Brands. *Senate Document Number 142, 72nd Congress, Second Session.*

He contributed a chapter on Developments in Retail Distribution to Trends in Management (edited by G. T. SCHWENNING).

He wrote Scientific Marketing Management, a chapter in *Management Problems* (edited by G. T. SCHWENNING). Chapel Hill: University of North Carolina Press.

He is directing the following research:

H. C. NOLEN. (Progress on master's thesis.) Modern Methods of Designing Retail Stores.

MILTON S. HEATH read the following paper before the Southern Regional Study Conference, Chapel Hill, April 3, 1933:

The Theory of Optimum Regional Production.

PROFESSOR HEATH is engaged at present upon a study of the recent development of motor and water transportation in the South. He is also continuing his study of the history of Southern railroads.

He is directing the following master's thesis:

D. N. BARRON. The History of the Central of Georgia Railroad.

H. D. WOLF has the following research in progress:

The Yellow Dog Contract.

This study was virtually completed two years ago, but has been withheld from publication pending, first, court action on the Norris bill, and, more recently, the anticipated developments of the Roosevelt Administration in this direction.

The Doctrine of High Wages.

The Labor Policy, Past and Present, of the Federal Government.

He has under his direction:

H. M. DOUTY. (Doctoral dissertation.) The North Carolina Industrial Worker, 1880-1930.

R. HOOD. (Doctoral dissertation.) Labor Standards and Labor Conditions in the South.

R. HOOD. A Bibliography of Southern Labor.

The following article, written under Professor Wolf's supervision, was published in the May, 1933, number of *Social Forces*:

H. M. Douty. Labor Unrest in North Carolina, 1932.

Wirth F. Ferger has published during the year:

The Static and the Dynamic in Statistical Demand Curves. *The Quarterly Journal of Economics,* XLVII: 1. 1932.

Despite the growing number of current statistical studies purporting to measure the elasticity of demand for various specific commodities, insufficient attention has been given to the fundamental concepts of economic theory and statistical methodology involved. Specifically, some consideration must be given to the seeming conflict between the static concepts of classical theory and the dynamic propensities of the statistical approach. This study attempts a reconciliation of these concepts, showing that statistical methods are available which, applied to certain cases of price-quantity phenomena, will yield substantially the demand curves of orthodox theory. Care must be exercised in selecting techniques suitable to the particular problem in hand. A qualitative logical analysis must both precede and accompany statistical analysis. Not only are the results dependent on the skill and judgment of the statistician, but they are also subject to the universal limitations of statistics.

The following master's theses were completed during the year under the supervision of the Department:

John McCorkle Akers. Finances of the City of Charlotte, North Carolina, 1917-1929. (Under the direction of Clarence Heer.)

During the period from 1917-18 to 1928-29 the governmental-cost payments of Charlotte increased from $792,661 to $3,287,291. An examination of the different departments of the city government and of the various expenditures reveals the fact that the cause of this increase may be attributed to several factors: the enlargement of the city limits from 12.8 to 19.3 square miles, the growth in population from 41,000 to 81,000, the increase in quality and quantity of services offered, and the rise in the price level with the accompanying increase in the amount expended for wages, salaries, fuel and lights, building materials, and other items of municipal expense.

William Gannaway Coltrane, Jr. North Carolina Laws and Decisions Relating to Accounting. (Under the direction of E. E. Peacock.)

The paper presents North Carolina statutes and supreme court decisions relating to accounting and correlates these with accounting principles. The statutory control over the public accounting profession and opinions relative to the duties and liabilities of public accountants are discussed. Laws relating to governmental accounting are presented, using the offices of state auditor, county and city accountant as a working center. Laws and decisions relating to many phases of accounting in general are analyzed, such as recording of

stock issues and transfers, cash and stock dividends, impairment of capital, accounting records as evidence in court, Statute of Limitations as related to accounts, errors in settled accounts, and testimony of accountants in court.

The study reveals that the statutes and judicial opinions in general are in harmony with best accounting principles; and it is expected that as the accounting profession reduces its practice and terminology to a recognized body of standards they will find their place in the legal system.

LANKFORD JOSEPH FELTON. The First Year of the Reconstruction Finance Corporation. (Under the direction of JOHN B. WOOSLEY.)

Believing that by the latter part of 1931 the decline had proceeded far enough, and that recovery could be hastened by governmental efforts to control deflation and restore confidence, the Federal Government created the Reconstruction Finance Corporation. It was to give aid to financial institutions, railroads, agriculture, and export trade. Its aid has been extensively used, but the Reconstruction Finance Corporation has not accomplished all that its sponsors hoped for it.

ROBIN HOOD. The Loray Mill Strike. (Under the direction of H. D. WOLF.)

This is a case study of the strike which occurred during 1929 in the Loray textile mill, Gastonia, N. C., a division of a Rhode Island corporation, the Manville-Jenckes Company. The underlying causes, the significant events, and the results of the dispute are discussed. The legal investigations into the kidnappings, the physical violence, and the shooting of Ella May Wiggins are treated, as are also the legal tactics employed by both defense and prosecution in the Aderholt trials.

McDONALD KELSO HORNE, JR. The Consolidated Printing of Weekly Newspapers. (Under the direction of MILTON S. HEATH.)

Approximately 3.8 per cent of the weekly newspapers in the United States are printed in plants which print more than one such newspaper. Obstacles to this practice are: intrenchment of small plants, added necessity for communication and transportation, inapplicability of commercial printing, unwieldiness arising from the scattered character of the organization, and resentment of out-of-town printing. Advantages are: more constant employment of machinery, reduction of duplicated typesetting, increased skill, more constant use of the skilled labor employed, lower material costs, a collective approach to national advertisers, and economical employment of additional kinds of machines and workers. Limited evidence indicates that consolidation increases the profits of the industry. It also tends to make newspapers possible in smaller communities, but to reduce the percentage of local reading matter printed.

JOHN BERRY McFERRIN, JR. The Forces Making for the Demonetization of Silver Since 1870. (Under the direction of C. T. MURCHISON.)

The countries dealt with particularly in this thesis are the United States, the Latin Monetary Union, India, China, Japan, and Mexico. The United States are included because of the political importance of the silver question; the Latin Monetary Union because of its being an experiment in international bimetallism; India, China, and Japan because of the tendency of eastern countries to cling to silver as a monetary standard; and Mexico because of its position as the leading producer of silver and the importance of the Mexican dollar.

The forces that have brought about the demonetization of silver have been the great increase in the volume of silver produced, which led to great fluctuations in the price of silver; and the increased economic intercourse between nations, which required that there be a uniform standard of value. The movement away from the silver standard has been aided by the introduction of the gold exchange standard and the improved banking facilities, both of which have reduced the amount of gold required by monetary systems.

DEPARTMENT OF EDUCATION

M. C. S. Noble is engaged in writing A History of the Public Schools of North Carolina, 1900-1934, which he hopes to bring to completion during 1934.

Edgar W. Knight has published during the year:

Education in China. In *China: Fact-Finders' Reports of the Laymen's Foreign Missions Inquiry.* xxviii, 725. New York: Harper and Brothers. 1933.

A chapter containing selected material from a study of secondary and higher education in China provided by funds from the United States, Canada, and Europe.

Education in Depressions. *North Carolina Teacher,* January, 1933.

The Child or Society? *Journal of Adult Education,* October, 1932.

Remaking Mankind. *The High School Journal,* December, 1932.

A. M. Jordan has published during the year:

Parental Occupations and Children's Intelligence Scores. *Journal of Applied Psychology,* XVII: 103-119. 1933.

He has completed a study, Influence of Friends on Cheating Scores, to be published by the American Historical Association, Social Science Division, in September.

The following books have been accepted for publication by Henry Holt and Company:

Educational Psychology, Revised Edition.

Experiments in Educational Psychology.

C. E. PRESTON is directing the following research:

EDNA Q. PROFFITT. (Progress on master's thesis.) An Investigation of the Background of Scientific Knowledge Possessed by Children in Grades Four-Seven, Inclusive, in Eastern North Carolina.

The following doctoral dissertations were completed during the year under the supervision of the Department:

FRANK WILLIAM GIRLINGHOUSE. Reconstruction and Education in Louisiana. (Under the direction of EDGAR W. KNIGHT.)

The Louisiana State Constitution of 1845 made provisions for a public school system which was inaugurated by a school act in 1847. The system functioned fairly effectively until the Civil War, indicating that the people of the state favored the principle of public education.

During the period of Presidential Reconstruction the citizens of Louisiana made attempts to rebuild the school system which had fallen during the War. With the inauguration of Congressional Reconstruction in 1867, however, the school system became a part of the political machine under the control of carpet-baggers, scalawags, and Negroes.

Notwithstanding the fact that school legislation during the Congressional régime was more specific and mandatory with respect to control, support, teacher training, etc., than that of the pre-war days, the system of schools was not effective. The inefficient functioning of the schools during the period was due largely to the broken confidence of the people, fraud, graft, and misappropriation of school funds, and to the fear of the mixed schools which were made mandatory by the Louisiana Constitution of 1868.

The conclusion was reached that the good influence of reconstruction on education in Louisiana was slight, and that the ill-effects of the period were numerous and were not overcome for many years after the return of home rule in the state in 1876.

ORBIE EARL MICHIE. An Analysis of the Amount of Training Given Prospective High School Teachers in Certain Types of Teaching Activities and an Evaluation of these Activities for a Teacher-Training Program. (Under the direction of W. J. MCKEE.)

This study shows: (1) the 84 types of teaching activities mentioned in recognized textbooks on general methods in secondary education; (2) the amount of training given by the Class A schools of The American Association of Teachers Colleges in these 84 types of teaching activities; (3) the amount of training received by graduates of the Class A schools of The American Association of Teachers Colleges in these 84 types of teaching activities; and (4) an evaluation of these 84 types of teaching activities for a teacher-training program.

From this study, it is concluded: (1) there is a marked tendency for the Class A schools of The American Association of Teachers Colleges to provide some opportunities for training in each of the 84 types of teaching activities;

(2) graduates of the Class A schools of The American Association of Teachers Colleges are actually engaged in each of the 84 types of teaching activities and indicate that they have received a certain amount of training in each of the activities; and (3) the commonwealth composite decile ranks, according to desirability, performance, difficulty, and importance, indicate that the 84 types of teaching activities possess value for teacher-training purposes.

The following master's theses were completed during the year under the supervision of the Department:

Thomas Cicero Amick. The Development of the Curriculum in Mathematics in the Secondary Schools of the United States Since 1890. (Under the direction of N. W. Walker.)

This thesis, which is historical in its nature, discusses the mathematics curriculum of 1890, the objectives of the curriculum, and reasons for the static curriculum of the time. Attention is called to the discontent of educators and education associations with the curriculum. Reports of committees appointed to study the curriculum and suggest necessary changes and improvements are studied, and the improvements in the curriculum as a result of changes made are noted.

Chapter VI deals with the curriculum as it is today, compares it with that of 1890, notes the differences in objectives, and points out present curriculum trends.

Mary Bacon Brooks. An Integrated Unit Course in Fourth-Grade Geography. (Under the direction of W. J. McKee.)

The problem involved in this thesis is of a two-fold nature, namely, (1) the determination of the aims and objectives and major topics for fourth-grade geography through a study of best current practice as indicated by highly recommended courses of study, by outstanding professional opinion, and by the analysis of the content of certain recent and highly evaluated textbooks in geography; and (2) suggestions for the development of a tentative course of study, which will contain units of work, activities, and procedures that will have potential possibilities for the realization of the objectives of fourth-grade geography.

The aims, objectives, units, and activities were checked carefully for value, integration, placement, and universality.

Harry M. Chester. The Extent to Which the Teachers of the I-AA High Schools of North Carolina Continue their Professional Training in Service. (Under the direction of E. R. Mosher.)

The present status of the in-service training of teachers in the I-AA schools in eighteen selected activities was presented. A comparison of various groups of the teachers participating shows that these activities are utilized more frequently (1) by women than by men; (2) by married women than by single women; (3) by department heads than by members of departments; (4) by members of the commercial, natural science, and social science departments

than by members of the other departments; (5) by graduates of Duke University and the University of North Carolina than by graduates of other colleges; and (6) by teachers of fifteen and sixteen years of experience than by others. By means of the analytical tabulations presented, certain weaknesses in the in-service training of teachers were discovered, and recommendations were made whereby the training could be improved.

JOHN HENRY COWLES. A Study of Promotion Practices in the City Elementary Schools of North Carolina. (Under the direction of GEORGE HOWARD.)

The percentage of non-promotion in the city elementary schools of North Carolina is about three times as high as that of a group of cities of other states. Reports from the North Carolina cities indicate that little has been done to improve pupil progress and that there is generally no definite promotion policy in keeping with the changed attitude toward the function of the public school.

After a review of some of the more recent experiments in this field, the following recommendations for improving promotion are made: study of pupil progress in local schools and of successful plans used elsewhere; adoption of policies; grading on the basis of achievement and teachers' judgment; classification on the basis of IQ; promotion on the basis of achievement adapted to the ability of the group; provision for non-promotions in special classes or with special teachers, and, if possible, conditional promotion rather than repeating for doubtful pupils.

A. DOYLE EARLY. The Most Common Errors in Multiplication in Algebra Made by Eighth-Grade Pupils Who are Studying Algebra for the First Time. (Under the direction of ROY W. MORRISON.)

An analysis of unit-skills involved in multiplication was undertaken, individual diagnostic tests constructed, and individual diagnosis made of one hundred algebra pupils in four counties in North Carolina. The type-errors identified have been tabulated for comparison and the following conclusions reached: (1) the degree to which the learning units in eighth-grade algebra may be divided is determined by the use to be made of the analysis; (2) a practical procedure that a classroom teacher may use is carefully defined in the procedure in this investigation; (3) the frequency in this study of errors which can be attributed to inadequacy in specific habit formation indicates a need for remedial teaching; (4) inferences from written solutions of problems as to the cause of error are not reliable; (5) many errors are apparently due to interference of habits in previously learned hierarchies with those appropriate to the process more recently learned.

JACOB SIPE FLEMING. A Study of Administrative Practices Applying to the Selection of Teachers in North Carolina Public Schools. (Under the direction of GEORGE HOWARD.)

The study was based on returns from a two-page printed inquiry blank sent to the superintendents of the 100 county and the 95 special charter school systems of the state. By mail and personal interview, replies were received from 100 per cent of both county and special charter schools.

The practices studied and investigated pertained to (1) educational requirements, (2) experience requirements, (3) employment of married women as teachers, (4) home talent, (5) age of teachers, (6) church membership, (7) teachers' dancing, (8) teachers' playing cards, (9) women teachers' smoking, (10) form of application.

The conclusions reached were: (1) The majority of all elementary schools required new teachers to hold at least a Primary or Grammar Grade Class C certificate; all high schools required new teachers to have a high school teachers' certificate, Class B or A. (2) Few schools required experience of new teachers. (3) A majority of schools would employ married women as new teachers. (4) A large percentage of county but not of special charter systems preferred home talent. (5) Few schools had a maximum age requirement for teachers. (6) Only a small percentage of systems considered church membership of teachers. (7) Few schools forbade teachers' dancing. (8) Few schools forbade teachers' playing cards. (9) Some schools, but not the majority, had a rule or policy against women teachers' smoking. (10) Practically all schools used and required formal application blanks and sent confidential information blanks to references.

Lorton Herbert Floyd. Some Presbyterian Contributions to Education in North Carolina. (Under the direction of Edgar W. Knight.)

This thesis reviews the economic, religious, and political history of Scotch Presbyterian people of northwestern Europe, and attempts to show the effect of these experiences upon Scotch thought in matters of government, religion, and education. McAden, Pattillo, and Caldwell, sent by the Synod of Philadelphia and New York to North Carolina for missionary service, found it necessary to establish academies in order to fix their religious principles in the minds of the people. In this connection it is shown that Presbyterians directed the University of North Carolina during its early history.

The efforts of Murphey and Morehead, inspired by their teacher, David Caldwell, are traced in Murphey's contribution to the educational life of the state in the first organization plan for schools, and in Morehead's economical development of these plans and the establishment of Edgeworth College for Women. C. H. Wiley established the common schools and therefore carried out the plans of Murphey and Morehead. Charles D. McIver, whose mission was the re-establishment of public schools through public taxation and the establishment of the North Carolina College for Women, continued the educational ideals of his predecessors.

The last chapter of the thesis gives an account of what Presbyterians are doing to educate the people through their own institutions. A brief review of their principal schools is given.

WILMA H. GARNER. Types of Errors and Inadequate Procedures Found in Subtraction in High School Algebra. (Under the direction of ROY W. MORRISON.)

This study is based on individual observation and analysis of seventy-eight pupils working problems in algebraic subtraction. These problems included each learning unit found in a careful analysis of the whole process.

The following factors important in the teaching and learning of algebraic subtraction were discovered: (1) The deficiencies in training represented by type-errors in working problems can be diagnosed better by the technique of observing the pupil working and analyzing his verbal reports than by studying his completed subtractions. (2) There are important differences in the frequency with which pupils make different types of errors. (3) The inadequate habits and procedures accounting for a single type-error are varied and may be found singly or in combination. (4) Many errors are made because of the interference of habits and procedures appropriate to previously or subsequently learned processes with those appropriate to the process of subtraction. (5) Preventive and remedial teaching, if applied at the point of error or difficulty, can apparently be based on such a diagnosis. (6) Further investigations involving (a) analysis of all algebraic processes into learning units, and (b) experimental evaluation of preventive and remedial teaching techniques and materials is required in order to teach algebraic processes economically.

ALFONSO GREER GLENN. A Survey of Public Education in Watauga County, North Carolina. (Under the direction of GEORGE HOWARD.)

The purpose of this study is (1) to set forth as completely as possible the present educational conditions in the public schools of Watauga County, North Carolina, and (2) on the basis of facts found, to offer practical recommendations for improving and developing the school system. The sources of information are chiefly the records in the county school superintendent's office, and the experience and observation of the writer, gained from having lived in the county during most of his life.

The survey reveals the following outstanding weaknesses: too many small schools; length of term too short; inadequate buildings and equipment; inadequate libraries; no school supervisor; heavy teacher load; too many teachers in the elementary grades with low certificates; large turnover of teachers; low salaries of teachers; narrow curriculum offerings; poor pupil attendance; high percentage of failures, retardation, and elimination; inequality in assessed valuation of property per pupil.

It was recommended that Watauga County adopt a minimum term of eight months, with the extended term supported on a county-wide plan; that thirty-nine of the elementary schools be consolidated into eight centers, thus leaving only eleven small schools that it is impractical to consolidate; that the high schools be reduced from four to three; that the building plan necessary be financed through a county-wide bond issue; and that the curricula of the schools be enriched and broadened in order to meet more adequately the educational needs of the boys and girls of the county.

Robert Chalmers Harris. The Development of the Rural Public Schools in Cabarrus County. (Under the direction of E. W. Knight.)

Common schools, established in the county in 1841, made some progress until they were disrupted by the Civil War and the Reconstruction period. From 1865 to 1900 schools received little support. With increased public support, rural schools of the county attained a more satisfactory educational condition during the period 1900 to 1923. Since 1923 the chief developments have been in consolidation, transportation, material equipment, teacher-training, supervision, and general school efficiency. Today the schools of Cabarrus rank well, in many respects, with those in other counties of the state.

Edgar Thurman Hines. A Study of Failures in Freshman English at Virginia Polytechnic Institute. (Under the direction of Roy W. Morrison.)

This investigation seeks to identify, classify, and analyze some factors which were judged by instructors of English in the Virginia Polytechnic Institute to be contributing causes of failures in Freshman English.

A careful study was made of (a) the activities which consume the freshman's time; (b) the factors in students' homes, in their high school training, and in their college experience, which seem to condition the measure of their success in Freshman English; (c) the ability of entering freshmen to use correct English; and (d) intelligence scores as a means of determining causes of failures.

Conclusion: (1) Freshmen at V. P. I. spend a relatively large part of their time in non-scholastic activities. (2) There are factors in the homes, in the high school training, and in the college which bear a distinct relationship to the causes of failures. (3) The ability of V. P. I. freshmen to use good English is inferior to that of freshmen in general. (4) Intelligence scores indicate to a marked degree the sort of grades students will make in Freshman English.

Olivia Blanche Hocutt. The Conference for Education in the South; its Work and Influence. (Under the direction of Edgar W. Knight.)

This study traces the origin, development, work, and influence of the Conference for Education in the South. The first chapter deals with the political, economic, and social conditions after the Civil War, out of which grew the educational systems in the South. Chapter two deals with the origin and organization of the Conference, while the third chapter gives an account of its aims and general work.

The influence of the Conference for Education in the South is traced in chapter four. The fifth chapter gives a brief summary of the work and influence of the Conference. The conclusions, which are stated in the form of some specific needs of Southern education today, indicate in a very definite way the present need for an organization such as the old Conference for Education in the South.

ERNEST BOSTON ISLEY. Cheating in the School Room and Some of its Potential Causes. (Under the direction of A. M. JORDAN.)

The purpose of this study was to discover data of interest in connection with cheating in the classroom situation.

The data were secured by means of: (a) intelligence tests, (b) tests for the special purpose of measuring cheating, (c) a student questionnaire, (d) a civic attitude test.

The significant findings were: (1) a large per cent of pupils cheating in the classroom situation; (2) older pupils cheating more than younger pupils; (3) girls cheating more than boys; (4) no definite relationship shown between religious opportunities and cheating; (5) concomitant relationships are shown between cheating and (a) degree of intelligence, (b) school status, (c) choice of friends, (d) physical conditions in the home, (e) choice of literature, (f) civic attitudes.

SALLIE OLIVER LIGON. Historical Survey of the Education of Orphan Children in North Carolina. (Under the direction of EDGAR W. KNIGHT.)

The purpose of this study is to show the provisions which have been made for the education of orphan children in North Carolina from colonial times until the present. Although the apprenticeship system was not intended for orphans only, it did afford the earliest educational opportunity for them until orphanages were established. A brief history of some of the orphanages founded by churches, fraternal organizations, and a few individuals reveals the interest which has been taken and the efforts that have been made for the care and education of dependent children. Mother's aid and boarding and foster home care, more recent agencies, have contributed to the great cause of helping the unfortunate.

Many of the institutions have for several years sent their children to the public schools, and under the new school legislation of 1931 some orphanages now belong to the public school system of the state.

MANNING ALEXANDER SIMONS. Predicting College Grades in Schools of Education and Engineering. (Under the direction of A. M. JORDAN.)

This investigation attempts to determine what information may be used most effectively in predicting freshman scholastic success in two divisions of the University of North Carolina. The prognostic value of eleven different factors was studied.

In the School of Education, the best single factors for prediction, arranged in order of effectiveness, were: high school principal's prediction, high school grades, the North Carolina High School Senior Examination, and the American Council Test. Multiple correlations from .63 to .75 with college grades were secured by combining "principal's prediction" and the High School Examination.

In the School of Engineering, the best single prognostic factors were, in order, the High School Senior Examination, the American Council Test, and

the education of the student's parents. Multiple correlations from .67 to .72 were obtained by combining "education of parents" and the High School Examination.

Herbert Estee Stephens. Academy Movement in South Carolina up to 1900. (Under the direction of Edgar W. Knight.)

The academy, promoted through denominational zeal, private enterprise, and private philanthropy, was a private institution and was usually controlled by a self-perpetuating board of trustees. Expenses for operating purposes were obtained through gifts and grants, but principally through tuition fees. At first, the purpose of this type of school was not to prepare students for college, but to extend its course of study so as to produce a high type of citizenship. Later, however, the academy was used for both purposes. The academy, established prior to the Revolutionary War, remained as a dominant institution for almost a century. This was in part due to the failure of the state to provide a permanent common school fund before 1860. It served as an agency to promote both elementary and secondary education, especially the latter. The extended curriculum of the academy enabled it to give an adequate training to its students, as the Latin school did not do. The academy had a rapid expansion until 1860, when it began to decline because of the establishment of state schools. It did more to promote knowledge, to inculcate moral and religious principles, and to build a high type of citizenship in the state than any other organization of its time. Through this institution a system of education was provided for old and young, male and female. The academy caused higher institutions to become more efficient and was the forerunner of state normal schools. It gave a fairly adequate system of education to society at a time when the state could not.

James Williams Stewart. The Derivation of a Scale for Measuring General Science Information Among High School Seniors. (Under the direction of M. R. Trabue.)

The thesis is a description of the derivation of the above scale. The procedure used was (1) the preparation of a preliminary test from the results of the North Carolina High School Senior Examination for the years 1927, 1928, 1929, and 1930; (2) the derivation of the scale from the results of this preliminary test. The thesis contains the preliminary test and the scale that was derived. There is a summary stating (a) the procedures necessary to standardize the scale, and (b) a comparison of the scale derived with that of a standardized scale now in use.

SCHOOL OF ENGINEERING

T. F. Hickerson has evolved a new method for analyzing the stresses in continuous beams and frames subjected to various loading and restraining influences.

A new definition for *stiffness* and *degree of fixation* of a member, in

terms of its length, its moment of inertia, and its end-restraints, is presented and applied to advantage.

Utilizing extended applications of the Slope-Deflection theorem, a single formula has been derived giving the degree of fixation at the end of any member. Also, the bending moment in a loaded member is expressed in terms of the load and the end-fixation factors. Tables giving bending moment coefficients have been compiled for convenience.

A simple formula for the "carry over" factor has been developed, so that the bending moment at the far end of a restraining member can be easily evaluated in one operation.

Analogous formulas for the more complex case of variable moment of inertia are treated fully, with supplementary tables covering the following types of members: straight and parabolic haunches, gradually varying depth, and that of both depth and breadth battered equally in each direction.

This method of analysis assumes the structure subjected to bending only, while any possible sidesway, or deflection at right angles to a member, is for the time being prevented by the application of an imaginary force, to be dealt with subsequently in the process of satisfying the laws of statical equilibrium. The effect of sidesway on the structure itself is therefore dealt with indirectly.

A full presentation of the foregoing method, including numerous illustrative examples, drawings, and supplementary tables is now in complete manuscript form for early publication by Edwards Brothers, lithoprinters, Ann Arbor, Michigan.

PROFESSOR HICKERSON has published in mimeograph version: Elements of the Strength of Materials, a textbook for freshmen, used in General Engineering 6c at the University.

He has prepared the following articles:

The Effect of Earthquake upon Engineering Structures, a paper dealing with earthquake forces and how to design engineering structures to resist them safely. Presented at a joint meeting of the engineering societies shortly after the occurrence of the severe earthquake at Long Beach, California.

Importance of Highway Location Surveys and Investigations. Selections from a manuscript just prepared for *Highway Surveying and Planning*—second edition of *Highway Curves and Earthwork*, which was published by McGraw-Hill Book Company in 1926.

NEIL P. BAILEY has published:

The Measurement of Surface Temperatures. *Mechanical Engineering*, August, 1932.

The Effect of Streamlining the Under-Portions of an Automobile. *Automotive Industries,* May 13, 1933.

Professor Bailey has in progress:

The solution of the problem of cyclic heat flow from underground electric power cables, considering daily load and temperature cycles.

The solution of the case of steady flow was completed and published in the January, 1929, *Transactions* of the American Society of Electrical Engineers.

This is an extension of the previous work.

Heat Transfer from Engine Cylinders is being continued in conjunction with C. Carmichael.

He is directing the following research:

E. L. Midgett. The Design and Calibration of a Six-Inch Open Throat Wind Tunnel.

The following master's theses have been completed during the year under the direction of the School:

Arthur R. Hollett. Studies on the Operation and Control of a Separate-Sludge Digestion Sewage Treatment Plant. (Under the direction of H. G. Baity.)

Part I. A report of the preliminary studies and the design of a separate-sludge digestion plant for the town of Chapel Hill. A comprehensive survey of the community, population, sewage flows, stream conditions, selection of the type of treatment, and design of the individual units is made.

Part II. The methods adopted for the operation and control of the sewage treatment plant.

Part III. Research studies on the fluctuations in flow, characteristics of the sewage, efficiencies, heat losses in the sludge digestion tank, sludge drying on open beds, stabilization of the sewage effluent, and odor control by chlorination.

The performance of a sewage treatment plant reflects: (a) the interpretation and completeness of the preliminary studies and their application to the selection of the treatment process and the design of the individual units; (b) the methods of operation and the efficiency of the operating personnel.

Thomas Moore Riddick. A Comparative Study of the Effects of Lime and Ammonia in Reaction Control of Separate Domestic Sewage Sludge Digestion. (Under the direction of H. G. Baity.)

Three experiments were performed to determine the relative efficiencies of lime and ammonia for the control of reaction in separate sludge digestion. Experiment No. 1 required no reaction control, but demonstrated the uniformity of gas production from three separate flasks of digesting sludge and

determined the ratio of fresh to digested sludge which would permit acidification. Experiment No. 2 determined that for a ratio of fresh to digested sludge of 1.00: 0.42, reaction control was necessary for a period of seventeen days, and required approximately 50 cc. of 5 N lime solution and 35 cc. of 5 N ammonium hydroxide to maintain a pH of approximately 7.2. Experiment No. 3 was performed with sludge having the same ratio of fresh to digested solids as in Experiment No. 2, and was used to check the initial results obtained from that experiment.

DEPARTMENT OF ENGLISH

GEORGE R. COFFMAN has published:

Review of Millicent Carey: *The Wakefield Group in the Towneley Cycle*. A Study to Determine the Conventional and Original Elements in Four Plays Commonly Attributed to the Wakefield Author. *Philological Quarterly*, XII: 94-6. 1933.

He has edited Volume XXX of *Studies in Philology*. He is continuing his special studies in English literature of the fourteenth and fifteenth centuries and in medieval religious drama. His monograph, Old Age from Horace to Chaucer, has been accepted for publication in *Speculum*. This was read before the English section of the Modern Language Association in December, 1932.

PROFESSOR COFFMAN is directing the following doctoral dissertations:

MARY ELIASON. The Common Man in the Fourteenth Century with Special Reference to Chaucer, the *Towneley Plays*, *Piers Plowman*, and Gower.

JOHN W. SCOTT. Special Aspects of Characterization in Middle English Religious Drama.*

JOHN M. BOOKER is directing the following research:

J. O. BAILEY. (Progress on doctoral dissertation.) Scientific Fiction in English, 1817-1914. A Study of Trends and Forms.

HENRY E. COLEMAN, JR. Edward Fitzgerald's Translations and Their Influence Upon his Philosophy.

ELISE W. ROBERTS. Elizabeth Barrett Browning's Social Poems.

G. C. TAYLOR has had accepted for publication by the Harvard University Press a volume of Studies on Milton.

* It is a matter of sincere regret that the work of this investigation was interrupted by the illness and death of Mr. Scott.

Professor Taylor has in progress a study of Certain Medievalisms in Shakespeare's Plays.

A. C. Howell has published (with R. B. Sharpe):

Recent Publications: Studies in the Field of Renaissance and Seventeenth-Century Literature. *Studies in Philology,* XXX: 522-533. 1933.

This article is a composite critical review of some thirty outstanding contributions to the study of English literature in the period from 1500 to 1660.

Dougald MacMillan read before The Philological Club in November, 1932, a paper, David Garrick as Critic.

For abstract see *infra* p. 91.

He is engaged in the further study of theatrical conditions of the eighteenth century as a reflection of the culture of the period with special attention to the position and influence of David Garrick. He has also served as assistant editor of *Studies in Philology.*

The following doctoral dissertations are in progress under the direction of Professor MacMillan:

Kate J. Carmichael. Five Comedies by Colley Cibber: Materials for a Critical Edition.

M. A. Moore. The Use of Politics as a Theme in English Literature, 1714-1760.

M. P. Wells. Pantomime and Spectacle on the London Stage, 1714-1760.

The following master's thesis is in progress under his direction:

Ora Upshaw Downs. Garrick's Uses of his Sources.

Arthur Palmer Hudson has completed:

The Bell Witch of Tennessee and Mississippi: A Folk Legend. He was assisted in the gathering of material by Pete Kyle McCarter of the University of Wisconsin.

Portions of the study were read before the South Atlantic Modern Language Association in Atlanta, November, 1932, and before the Philological Club of the University of North Carolina, February, 1933. (Accepted for publication in the *Journal of American Folklore.*)

The legend is given in the form known to oral tradition in Mississippi, and compared with printed versions gathered in Tennessee, with similar American tales, and, in some of its motives, with European folktale analogues. The comparative study shows the independence of the Mississippi oral version and a marked tendency toward the vampire-tale type.

PROFESSOR HUDSON has in preparation:

Folk-Song in Recent Fiction Depicting the Southern Scene.

He has directed the following research:

W. W. SILLIMAN. (Progress on master's thesis.) Keats's Use of Greek Myth.

RAYMOND ADAMS has published during the year:

Thoreau's Literary Apprenticeship. *Studies in Philology,* XXIX: 617-629. 1932.

In Volume XI of the *Dictionary of American Biography* the article on George Parsons Lathrop.

He has completed the following studies:

Sir Walter Scott's Influence on Southern Life. Delivered as the Founders' Day address at Flora Macdonald College, November 12, 1932.

RICHMOND P. BOND has published during the year:

English Burlesque Poetry, 1700-1750. xi, 483. Harvard Studies in English, VI. Cambridge: Harvard University Press. 1932.

This is the first exhaustive study of one of the most important and interesting types of poetry in the neo-classical era. Burlesque poetry is defined; the characteristics of the types (parody, mock-heroic, travesty, Hudibrastic) are noted. The critical theory of burlesque in the seventeenth and eighteenth centuries is set forth at some length. The masterpiece of the *genre,* Pope's *Rape of the Lock* and the other famous burlesques—Phillips' *Splendid Shilling,* Gay's *Shepherd's Week,* Carey's *Namby-Pamby,* Pope's *Dunciad,* Browne's *Pipe of Tobacco,* and Shenstone's *School-Mistress*—are analyzed. The four types of burlesque are treated as such in two other chapters. The history of the non-English burlesque is traced by way of the imitations and frequent translations of burlesque poems in Greek, Latin, Italian, and French. The final chapter of the essay attempts to relate burlesque to the age in which it flourished so abundantly and (at times) so gloriously.

The second half of the volume is devoted to a register of more than two hundred burlesque poems, chronologically arranged with serial numbers. Complete information on each item is here furnished: title-page, author, date, length, verse form, type of burlesque, quotations, summary, significance, literary merit, bibliographical data. In this register the pertinent facts about each poem are thus arranged with the view to facilitate reference and to avoid hindering the progress of the main discussion. A bibliography and an index complete the volume.

PROFESSOR BOND is engaged on the study of Joseph Addison as man of letters and affairs; an edition of critical essays in the

eighteenth century; an edition of three heroi-comical poems in the Popean tradition; and several bibliographies relating to Restoration and eighteenth-century literature and scholarship.

Robert B. Sharpe has published during the year:

The Sources of Richard Brome's *The Novella. Studies in Philology,* XXX: 69-85. 1933.

James Hill, Player. *Modern Language Notes,* February, 1933.

Recent Publications: Studies in the Sixteenth and Seventeenth Centuries. *Studies in Philology,* XXX: 522-533. 1933. (With A. C. Howell.)

He has completed a study of the relation to the "Poetomachia" of the mottoes chosen by Ben Jonson and Thomas Dekker for the title pages of their published plays.

Harry K. Russell has published:

Elizabethan Dramatic Poetry in the Light of Natural and Moral Philosophy. *Philological Quarterly,* XII: 187-195.

He is engaged in a study of Elizabethan dramatizations of the doctrines of natural and moral philosophy and is investigating the Aristotelian conception of catharsis as related to Hippocratic medicine.

T. B. Stroup has published during the year:

Philosophy and the Drama. *The Times Literary Supplement* (London), January 19, 1933.

The following doctoral dissertations were completed during the year under the guidance of the Department:

William Richardson Abbot. Studies in the Influence of Du Bartas in England, 1584-1641.* (Under the direction of G. C. Taylor.)

These studies investigate Du Bartas's vogue and influence in Great Britain during the period in which numerous translations of his works appeared, 1584 to 1641. The first of these studies presents an account of the successive translations. The study leads to the conclusion that Du Bartas's *Les Semaines* first appeared completely Englished by Josuah Sylvester in 1608, and not in any of the eleven other years variously assigned to its completion by the implication or statement of authorities. This conclusion is based upon an examination of the translations that appeared from 1584 to 1641.

The second study presents the many British allusions to Du Bartas made within the period. It presents not only those allusions for this period that former students of Du Bartas have assembled in their studies but, along with

*Awarded Smith Research Prize in Languages and Literature.

these, twice as many references hitherto unnoticed by allusion hunters. The increased body of allusions that results indicates an enthusiasm between 1584 and 1641 for Du Bartas even more widespread than seems to be generally recognized.

The third study is concerned with the *Speculum Mundi* (1635) of John Swan, an encyclopedic writer hitherto barely mentioned in connection with Du Bartas. The examination of his book leads to the conclusion that Swan not only quoted from Du Bartas oftener than from any other poet but that in many instances he wrote prose passages dependent both in substance and manner upon Du Bartas's verse as translated by Sylvester in *The Divine Weeks.*

The fourth study, continuing the consideration of Swan's *Speculum,* leads to the conclusion that Swan's use of Thomas Lodge's *Summarie of Du Bartas* (1621) reveals a further unmistakable Bartasian influence, hitherto overlooked.

The fifth study is devoted to an examination of the *Sacred Poems* (1641) of Edward Browne, a writer of verses thus far unmentioned in published investigations of Du Bartas's influence. This study arrives at the conclusion that Browne, in addition to borrowing wholesale from Du Bartas (a practice he admits), was indebted substantially to the French poet in the portions of his work not acknowledged as dependent upon Du Bartas.

SAMUEL JESSE MCCOY. The Language and Linguistic Interests of Sir Thomas Elyot, with incidental chapters on his cultural background and his relations to his contemporaries and successors. (Under the direction of E. E. ERICSON.)

This study consists of a survey of the state of linguistic development in England and on the continent during the sixteenth century, a collection and interpretation of Sir Thomas Elyot's linguistic dicta, and an analysis from a historical point of view of his vocabulary and syntax.

There are six chapters and three appendices. Chapter I is a brief account of Elyot's life. Chapters II and VI contain a review of the linguistic situation during the sixteenth century. It is pointed out that the vernacular languages of Europe were, by the middle of that century, permanently established as the languages of government, literature, and science in the several countries; that this phenomenon was closely interwoven with the Revival of Learning, the renewed enthusiasm for knowledge and culture. In the latter part of the century the numerous books on language and rhetoric show an increasing interest in the perfection of English and a slight growth of the scientific approach to linguistic study. Chapters III, IV, and V, which with the appendices form the heart of the study, treat Elyot himself, his linguistic interests and activities, his vocabulary, and his syntax and style. Elyot (*c.* 1490-1546) was one of those in England who early combined the interest in the vernacular with the more intensive and extensive study of the classics of Greece and Rome. Most of his works are educational in intent, his books on the education of and advice to princes and his Dictionary being his most important contributions. One sees in all of his writing, however, the desire not merely to enlighten his countrymen but also to enlighten them through the

medium of their own native tongue. He wished that more good books were available in English; he himself set about translating some six or eight of them from Latin and Greek—not romances, but books of wisdom. English was not adequate for his purpose, it is true; but, although he complained that it was not, his laments were usually qualified with a "not yet" or the equivalent. Like the classical authors with regard to Greek and Latin, and like his foreign contemporaries with regard to their own tongues, he considered English the proper medium for Englishmen and quite capable of being raised to the condition of adequacy in all respects. Accordingly, he made free use of recent additions to its vocabulary from the classics, and added more than 200 words and 150 meanings. Some of these he used without comment, but many he was careful to explain clearly to his readers, either by means of a double expression, one member of which was a familiar word, or by a more direct and lengthy exposition.

The appendices contain (a) a reproduction of Elyot's prefaces and some excerpts from his works, most of which are not commonly available; (b) some orthographical phenomena in Elyot, which were omitted in the body because they are not significant historically; and (c) a list of Elyot's neologisms (with quotations from his writings). In this list, those words and meanings whose appearance in Elyot antedates the first entries in the *NED* are grouped separately. It includes all of his double expressions and all of his lengthier comments on his linguistic innovations.

MATHILDE MAYER PARLETT. George Eliot and the English Literary Periodical. (Under the direction of JOHN M. BOOKER.)

The purpose of this study has been to examine George Eliot's relations with the literary periodicals of her time, to investigate (1) her place in journalism as a profession for women; (2) her editorial and literary work for eleven contemporary serials, and the influence of these activities upon her life and art; and (3) the trends of contemporary periodical criticism of her creative work and the influence exerted upon her by such criticism.

The data collected with regard to George Eliot's place in the profession of journalism indicate that she was a figure of historical importance here, one of the pioneer free-lance women journalists and, with the possible exception of Mrs. Manley, the first of her sex to hold a position of editorial responsibility on a first-class English periodical.

Detailed discussion of George Eliot's relations with *The Christian Observer, The Coventry Herald, The Westminster Review, The Leader, Fraser's Magazine, The Saturday Review, Blackwood's Magazine, The Cornhill Magazine, The Pall Mall Gazette, The Fortnightly Review,* and *Macmillan's Magazine* shows that *The Westminster Review* played the most important part in the novelist's development. Her editorial labors for this periodical brought her acquaintance with the most advanced thinkers of the day; effected important changes in her religious, social, and political theories; drew her attention to the achievements of women novelists and to the possibilities of fiction writing as a profession for women; and, because of her close association with the

Radical *Westminster* staff, prejudiced the conservative press against any creative work she might publish under her own name. Her literary work for the *Westminster* gave her valuable practice in the art of composition; a wide knowledge of contemporary *belles lettres*, especially of fiction; and confidence in the value of her own work.

Examination of contemporary periodical criticism of George Eliot's creative work and of the relevant passages in her own letters and journals has prompted the following conclusions: (1) that the preservation of anonymity was a vital necessity to George Eliot and so recognized by her; (2) that the surrender of her anonymity, following the Liggins affair, subjected *The Mill on the Floss* to the hostile and prejudiced criticism that perverted the ethical teaching and misinterpreted the novel as the author's attempt to justify her own unconventional life and ideas; (3) that, contrary to the general impression, George Eliot was well informed as to the criticism of her work; (4) that to meet the situation the novelist, in her subsequent work, over-emphasized the ethical teaching and eliminated plot elements objectionable to her critics; (5) that the personal interpretation of *The Mill on the Floss*, added to the revelations of her family life in Seth Bede, led her to abandon her own experience as the main source of her literary material; and (6) that these adaptations gave impetus and direction to the changes generally recognized as characteristic of George Eliot's second period.

THOMAS BRADLEY STROUP. Type-Characters in the Serious Drama of the Restoration with Special Attention to the Plays of Davenant, Dryden, Lee, and Otway. (Under the direction of DOUGALD MACMILLAN.)

This study has been made with a view to determining (a) to what extent types were used, (b) why they were used, (c) how they were modified during the period, (d) what brought about the modifications, and (e) what general relation the use of type-characters has to the English culture of which they were a part.

In Chapter I is traced the tradition of the use of type-characters in English drama from the beginnings through the Elizabethan drama, emphasizing especially those types that persisted during the period. In Chapter II, the study proper, an attempt is made to treat each type in the serious drama of the Restoration (with particular attention to those types found in the plays of Davenant, Dryden, Lee, and Otway) in a comprehensive manner, defining the various types, showing how they change within the period, and what caused the changes. In Chapter III the general conclusions are drawn together. And, finally, in the three appendices are tabulated illustrative materials from the plays of Davenant, Dryden, Lee, and Otway: Appendix A is a hand-list of the serious plays of these dramatists; Appendix B is a chronologically arranged classification according to type of every character in the plays; and Appendix C is a chronological arrangement of the *Dramatis personae* of each of the plays, showing the type to which each character belongs.

The study shows that the use of type-characters was indeed widespread, fewer than a score of characters out of some forty-six plays of Davenant, Dryden, Lee, and Otway going unclassified. The reason for this great use of types is in general to be attributed to the classical criticism of the time, the haste with which plays were written, the desires of the court audience in the early years of the Restoration, and the peculiar abilities of certain actors. The chief modifications in the types from 1660 to 1690 were (a) a lowering of the social rank of characters, (b) the admission of a wider range of characters after 1677, (c) the return to Shakespearean type, and (d) the subsequent development of sentimental treatment of character. These changes were wrought by the gradual growth of bourgeois patronage, the general breakdown of the heroic play with its excesses, the return of Shakespearean models and criticism after 1677, and the seeds of sentiment lying dormant in the heroic plays themselves. Aside from changes wrought by these general tendencies, the philosophies of Descartes and Hobbes, the political events of the day, the demands of the actors, and the rise of the highly sensitive dramatists, Otway and Lee, affected the treatment of character in the drama.

Generally, the use of type-characters was a part of the classical-scientific tendency to order and to systematize.

The following master's theses were completed during the year under the guidance of the Department:

GENEVA ANDERSON. A Collection of Ballads and Songs from East Tennessee. (Under the direction of ARTHUR P. HUDSON.)

The purpose of this collection of 196 ballads and songs from East Tennessee is to present a representative body of folk-songs from a region somewhat neglected by folk-song students, to indicate the relation of the songs to the people of the eleven counties represented, and to suggest comparisons between the texts given and those contained in published collections.

The collection is prefixed by a short historical introduction. The material consists of twelve main groups of pieces, each of which has an introduction showing the relation of the individual song to the singers and to the group in which it belongs. Each piece has a head note which indicates the contributor and, if necessary, makes comment on the specific ballad.

The groups are: I. The English and Scottish Popular Ballads Found in East Tennessee; II. Other Imported Ballads and Songs; III. Ballads of the Dead and Dying; IV. Love Songs—Light and Heavy; V. War Songs; VI. Political and Campaign Songs; VII. Ballads of Wrecks and Disasters; VIII. Vagabond and Outlaw Ballads and Songs; IX. Songs of Orphan Children; X. Nursery and Game Songs; XI. Religious and Moralistic Songs; XII. Miscellaneous Ballads and Songs.

The study is equipped with a bibliography and an alphabetical index of titles.

INEZ PORTERFIELD BROOKS. The Philosophical Background of Pope's *Essay on Man*. (Under the direction of DOUGALD MACMILLAN.)

This study undertakes to present the philosophical tenets of the *Essay on Man* in relation to the philosophical doctrines of Shaftesbury and Bolingbroke. A survey of the Deist movement is presented as background for the didactic poem which derives its inspiration from Deism. The objection to J. M. Robertson's view that the *"Essay* is in large part pure Shaftesbury filtered through Bolingbroke" is that various passages were taken directly from Shaftesbury without the medium of Bolingbroke's imitation. It is found that Pope was interested in other contemporary English philosophers, such as Berkeley, Shaftesbury, Mandeville, and Woolaston, besides his friend, Bolingbroke.

DALMA ADOLPH BROWN. Satire in George Crabbe's Works Before *The Borough.* (Under the direction of RICHMOND P. BOND.)

The purpose of this study is to analyze in detail the satire in the poems of George Crabbe before *The Borough* and to point out in a general way Crabbe's tendencies as a satirist in the later works. The satirical poems are discussed in chronological order and, except in the case of minor poems, are considered from the following viewpoints: literary tradition, form, spirit, method, objects satirized, style, literary merits, and relation to other works. The main conclusions reached are as follows: that Crabbe was by nature a satirist; that his works ending with *The Borough,* with the exception of *The Parish Register,* are deeply colored with the satiric spirit; that the tales are close to satire in object and manner in many instances; that the spirit of Crabbe's satire is closely blended with that of realism and didacticism, is impersonal, exaggerative, often mildly humorous, and tends to employ sarcasm and irony as its chief instruments; that direct rebuke and the satiric portrait are his chief methods of satire; that he belongs to the school of Pope and Young in his satiric style and technique; and that the objects satirized are chiefly moral-social, often literary, often religious, but rarely political.

KENNETH DANIEL COATES. Hugh Swinton Legaré, Literary Critic. (Under the direction of GREGORY PAINE.)

This evaluation of Hugh Swinton Legaré as a literary critic consists of a brief survey of his life, a discussion of the *Southern Review* and his connection with it, and an analysis of his literary criticism in that magazine. The results of the study seem to indicate that Legaré's contemporary reputation as one of the leading scholars and critics of his generation was justified.

ROSE MAUREEN FAULKNER. Jacobean Art Songs. (Under the direction of A. C. HOWELL.)

Eight hundred and fifty-four lyrics from the printed song books of the Jacobean period in England supply the material for this study. These lyrics, for the most part anonymous, were set to music by the leading Jacobean composers, and were classified by them as madrigals or "ayres," according to the form of their musical setting. This thesis is an intensive study of the subject matter and versification of these songs and an analysis of the differences between the lyrics of the madrigals and "ayres" as the result of musical

technicalities. In connection with the possible pastoral derivation of the word "madrigal," conventional pastoral elements are traced. Stanza forms, rhyme schemes, and metrical characteristics are listed; word usage and figures of speech employed are studied; an opening-line technique is discovered. A chapter is devoted to the songs of Thomas Campion, who claimed for himself the authorship of the lyrics as well as the composition of the music in his song books. Campion's songs are studied in this light, and the effects of his practical musical knowledge upon his prosody are sought.

BERNICE FREEMAN. Shakespeare's Changing Technique in Staging *Love's Labors Lost, Twelfth Night,* and *The Tempest.* (Under the direction of ROBERT B. SHARPE.)

Shakespeare knew the possibilities of his stage, and as he progressed in playwriting he made definite advances in the use and handling of his physical equipment. The study of *Love's Labors Lost, Twelfth Night,* and *The Tempest* shows an increasing ability on the part of the author to force his stage to serve his art.

Whenever the development of a particular staging device cannot be traced as a continuous improvement from *Love's Labors Lost,* through *Twelfth Night* to *The Tempest,* the tendency seems to have been toward the abandonment of the first method for the adoption of a new one during the middle period, with a final combination of the two in the last part of the author's career.

MONROE JOHNSON HAGOOD. The Early Demand for a Native American Literature, from the Revolution to 1825. (Under the direction of GREGORY PAINE.)

Between the Revolution and 1825, in books and magazines, there was a widespread plea for American writers to devote their efforts toward literature which should be peculiarly native, in originality and the use of native scenery, characters, and subjects. Most of the expressions of the demand were in the periodicals of the time, but scattered appeals were made also in prefaces and introductions to books, in prologues to plays, and, indirectly, in the evidences of the popularity of productions. The strongest of the motives prompting the demand were patriotism and dislike for dependence. The greatest volume of expressions of the desire for national literature were not specific as to the types of literature preferred. The most popular and most frequently demanded types, however, were: first, poetry; second, history, biography, and travels; and third, fiction. Growing out of the demand for native literature was a movement for independent criticism.

NATHANIEL HARDING HENRY. Milton's Latin Secretaryship. (Under the direction of A. C. HOWELL.)

The problem of this paper has been to determine the nature of Milton's official duties in the interregnum governments and his importance and prestige in the Commonwealth officialdom. An effort has been made to establish the

relationship between his official position as Secretary for Foreign Tongues and the four political tracts that he wrote at the order of the Council of State.

As much of the original material as is available in the library of the University of North Carolina has been examined, especially the *Calendar of State Papers,* the *Thurloe Papers,* Hamilton's *Milton Papers,* Whitelock's *Memorials,* and the five seventeenth-century biographies of the poet.

The honor of the secretaryship, although it entailed numerous exacting duties, appears to have been Milton's principal compensation for the pamphlets he wrote in defence of the Commonwealth and Protectorate governments. The concluding chapter suggests a biographical influence of this period upon his later work, and points out that his early continental reputation was entirely dependent upon his literary defences written at the order of the Council of State.

CHARLES BREWER KESTLER. The Influence of Goethe upon Matthew Arnold. (Under the direction of JOHN M. BOOKER.)

This thesis is an investigation into the interest of Matthew Arnold in Goethe with the determination of the latter's influence upon Arnold in mind. The results show that Arnold received his first training in German from his father and that he was introduced to Goethe by Carlyle. It was also shown that Arnold neglected Goethe the literary artist for Goethe the critic and thinker, and that he was influenced in this conception of Goethe by the force of his own character and intellectual development. It was not possible to point out any positive influence of Goethe upon Arnold's social or literary criticism; but instances of possible influence in certain cases were pointed out, together with other possible sources of influence in those cases. The final conclusion is that Arnold used Goethe as an illustration or reënforcement of his own ideas.

ANNE ELIZABETH LILLY. Solitude and Retirement in English Poetry, 1700-1751. (Under the direction of DOUGALD MACMILLAN.)

The poems dealing with solitude may be grouped according to the motive of the one seeking it, as follows: as a solace to the rejected or absent lover; as an inducement to the muse; as a means of satisfying the ego, of allowing the "natural genius" to assert itself and rejoice in the soothing power of isolation denied to lesser beings; as a necessary condition for contemplation, which, in turn, leads either to self-discipline and reasonable detachment, or to a vague pensiveness and pleasing melancholy; as a pathway to God through observation of, and ecstatic communion with, His manifestation of Himself in nature; and as the fitting circumstance for woeful moralizing about death, the grave, and immortality. Retirement is desired either as an escape from the town with its noise, ambition, and vice; as an approach to the happiness sentimentally conceived as belonging to the golden age and the "noble savage"; or as the best means of attaining a calm, peaceful life, particularly in middle or old age. The joys of health, friendship, enjoyment of the classics, and virtuous living are attendant on the country life. A chronological survey of the poems

discussed is appended, but no attempt is made to trace the development of the desire for solitude or to prove its significance as a harbinger of the Romantic Movement.

Waldo Forest McNeir. Dramatic Values in the Passion Groups of the Corpus Christi Plays. (Under the direction of George R. Coffman.)

This thesis is designed to bring under observation a large body of material from each of the four English collections of cycle plays, in order to study a representative cross section from the standpoint of dramatic criticism. As an introduction, the liturgical observances of Holy Week are discussed, since these observances—and especially the dramatic reading of the *passio*—are closely connected with the vernacular medieval Passion play. Chapter Two deals with the transition period of liturgical drama, with particular reference to the effects of laicization on the Passion play in the century from 1250-1350. In Chapter Three is pointed out the futility of judging the medieval drama by classical or modern criteria; in consideration of the necessity for relative criteria, the full conditions of a Corpus Christi performance are presented as far as possible, with an attempt to visualize the attitude of the Middle Ages towards its own dramatic product. In Chapter Four certain aspects of plot management, staging, dialogue, and characterization are shown to give the cyclic Passion play definitely dramatic qualities, and these are regarded as evidence that the medieval playwright understood the technique of drama better than is generally granted.

Charles Leonard Pittman. Byron and the Counter Revolution. (Under the direction of Arthur P. Hudson.)

The purpose of this thesis is threefold: (1) to discover what were Byron's revolutionary principles; (2) to account for his revolutionary career; (3) to determine to what extent the poet was sincere in his protest.

Byron's entire life was characterized by an opposition to monarchy, a passion for national freedom, and a sympathy, free from illusion, with the French Revolution. There is, however, no evidence that the poet wished to see a political revolution in England. Nor did he advocate the overthrow of all government. Essentially a religious man, Byron made no attempt to destroy religion. Although he believed that society should be disentangled from an artificial social system, there was no attempt on his part to supplant all social organizations.

Byron's revolutionary nature was due to his inheritance, his environment, his education, and the temper of the age in which he lived.

In spite of many surface affectations, there was no insincerity in Byron's social, religious, and political activities after his departure from England in 1816. The true explanation of his aiding the Italians and the Greeks is that he had imbibed a passion for liberty that could not contain itself. He longed for fame, but he determined to deserve it.

FRANCES ROBERTS. The Supernatural in Scott. (Under the direction of ARTHUR P. HUDSON.)

It is the purpose of this thesis to trace the development of the supernatural in literature before the Romantic Movement; to show that there was a definite advancement of supernatural technique by the Romantic poets, particularly Scott; to give Scott's own theory of the supernatural; and to classify the supernatural motifs in Scott's works, relating them to his theory and the practices of his predecessors and contemporaries.

In early literature the supernatural was unconsciously injected because it was a part of the the beliefs of the people. The Gothic novelists employed supernaturalism in an artificial manner, using horror for its own sake. Coleridge, in *The Ancient Mariner,* attempted to make "the supernatural natural" by displaying the effect of horrors on an ordinary man. This method was followed by the Romantics. Scott, more than any of them, uses the supernatural to show its effect on people. He makes it "natural" and revealing as to character by relating it to human life.

JOHN WALTER SCOTT. Notable Aspects of Satire in the Towneley Cycle. (Under the direction of GEORGE R. COFFMAN.)

This thesis is an endeavor to point out and classify the satire in the Towneley cycle of Corpus Christi plays. For this purpose an introductory section on chief types of medieval satire and the conditions that encouraged it was necessary. Conclusions reached were as follows: (1) the political and economic satire of the Towneley plays is rich, conventional in object but unique in treatment; (2) there is none of the usual religious satire in these plays; (3) the satire on women here is vivid, but not original in any way; (4) there is some kindly, universal satire in the plays; (5) the distribution of this satire is confirmatory, but by no means conclusive, evidence for the projected Wakefield Canon; and (6) the Towneley cycle is unique among the great cyclical dramas for the amount and variety of its satire.

KATHERINE BRITTAIN SMITH. Charles Lamb's Criticisms of His Contemporaries. (Under the direction of ARTHUR P. HUDSON.)

An examination of Lamb's criticism reveals the conflict between the interpretative attitude of the Romantic group of critics, which included Lamb, and the judicial attitude of the Augustan group, which included most of the reviewers of his day. It further reveals Lamb to be impressionistic in method, highly selective in taste, and distinctly prejudiced in attitude. He was enthusiastic and accurate in his appreciation of Coleridge; thorough in his appreciation of Wordsworth's style, if not of his philosophy; extravagant in his admiration of Southey; and duly responsive to the human and dramatic in Keats, but not to his extreme sensuousness. His prejudices, not seen to any marked degree in his estimates of his friends, Coleridge, Wordsworth, Southey, and Keats, or even in those of Burns, Cowper, and Blake, amounted almost to aversion to Byron, Shelley, and Carlyle; indifference to Scott, Tennyson, Hazlitt, and DeQuincey; and to undue preoccupation with certain distinctly

minor writers like Charles Lloyd, George Dyer, and Bernard Barton. No attempt is made to indicate the relative position of Lamb as critic or to estimate the value of his criticisms.

Marion Bruce Thomas. The Humanitarian Interests of Henry Fielding as Manifested in his Writings. (Under the direction of Dougald MacMillan.)

This thesis is a study of Fielding's interest in various social reforms. The conclusions reached are: Fielding was interested in reforming the laws relating to the poor, to debtors, and to criminals. He suggests concrete remedies and asks for the passage of new laws concerning drinking, gambling, and extravagance among the lower classes. He calls for the strict enforcement of the laws against prostitutes. He pleads for a law preventing cruelty to animals, and appeals to public opinion to eradicate dueling, to change the absurd regulations of the charity hospitals, and to wipe out Deism, since he regarded all these as evils.

Dorothy Mae Unangst. *The Atlantic Monthly,* 1857-1881. (Under the direction of Gregory Paine and Raymond Adams.)

The province of this thesis is an investigation to determine exactly what type of periodical *The Atlantic Monthly* was during the editorship of its first three editors, James Russell Lowell, James Thomas Fields, and William Dean Howells. To familiarize the writer with the contents of these first forty-eight volumes, and because the articles in the first nine volumes were unsigned, a list of the contributions was compiled and significant material was carefully examined. Cross sections were then made to observe sectional tendencies, evidences of the current movements in American literature, reflections of the personalities of the different editors, and awareness to contemporary events. Although much of the work was of a bibliographical nature, certain salient facts about the early history of the magazine were presented.

Dean A. Ward. Characterization in the Novels of Herman Melville Previous to, and Including, *Moby-Dick.* (Under the direction of Raymond Adams.)

In these first six of his novels Herman Melville uses virtually all the possible means of character portrayal. Those on which he relies mainly are (1) action, (2) exposition or direct statement, and (3) speech, named in the order of their frequency of use. A greater use by far is made of action than of any other mode of character portrayal; it is used in two out of every five characterizing passages. Exposition or direct statement is used most in *Omoo* and *Mardi,* because in *Omoo* many of the characters are dismissed shortly after being introduced and because in *Mardi* the emphasis is on philosophical ideas rather than action and characterization. Better variety and distribution of method are found in *Moby-Dick* than in any of the others, which helps to account for the superiority of the book.

DELOS DONALD WICKENS. Nineteenth-Century Utopias as Reflections of Social Issues. (Under the direction of JOHN M. BOOKER.)

The purpose of this thesis is to study the utopias written during the nineteenth century in England with the object of finding out to what extent and in what manner the thought of these utopias was influenced by contemporary conditions. Spence, Ellis, Buckingham, Pemberton, Lytton, Hudson, and Morris were the authors of the utopias studied. They are listed in their chronological order. Spence published in 1795, Morris published in 1891, and the remainder are scattered rather evenly throughout the century. Thus we may conclude from our study of these nineteenth-century utopias that their reflections assembled present a spectrum of the social issues of the century; and that, as individual reflections, they do not show the philosophic detachment some might expect, but are shaped to no small extent by the personal experiences, prejudices, and tastes of their authors.

DEPARTMENT OF GERMANIC LANGUAGES

E. C. METZENTHIN presented the following paper to the Germanic section of the North Carolina Education Association on March 24, 1933:

An Excursion into the Field of Unsolved Linguistic Problems.

Should not the science of linguistics be transferred from the School of Liberal Arts to that of Applied Sciences, section of Psychology or Physiology? Is the prehistoric word for the pronoun of the first person singular (egó in Greek, égo in Latin) in any way related to that for the number "one" (ékas in Sanskrit, echád in Hebrew)? If so, are "two" and "thou" also cognates? Is the Indo-European "8" the dual of prehistoric "4," and what was the original meaning of this "4"? Have not some Indo-European and Semitic consonants a leaning towards the feminine gender, just as have some vowels? Does the evolutionary assumption of an undirected, gradual development from primitive speech within, and through, the masses of the respective peoples explain satisfactorily the intricate morphology of some languages in their earliest known status?

PROFESSOR METZENTHIN is continuing his study of Old Germanic manuscripts, with a view to establishing more definitely the dates and places of their completion.

F. E. COENEN has edited and prepared for publication a text of George Urbat's, *Der letzte Einsatz*. This reader, which is representative of German post-war life, was furnished with notes and vocabulary.

He has the following research in progress:

Wilhelm Raabes *Deutschtum, an seinen Deutsch-Ausländern dargestellt,* a dissertation under the direction of Professor A. Wrede of the University of Cologne, Germany.

Meno Spann has published:

Exoticism and Heinrich Heine. *Studies in Philology,* XXX: 86-102. 1933.

DEPARTMENT OF GEOLOGY

William F. Prouty has completed the following research:

Geological Conditions in the Foundation of the University Dam. A paper presented to the North Carolina Academy of Science at Davidson, N. C., May 6, 1933. Now being prepared for publication.

Ancient Fossils on a Modern Beach. A paper presented to the North Carolina Academy of Science at Davidson, N. C., May 6, 1933. Now being prepared for publication.

Work has been continued during the year on the Triassic areas of North and South Carolina and new work undertaken in regard to the origin of the so-called "Carolina Bays."

Gerald R. MacCarthy has published during the year:

The Rounding of Beach Sands. *American Journal of Science,* XXV: 205-224. 1933.

An article on Calcium Carbonate in Beach Sands has been accepted for publication by the *Journal of Sedimentary Petrology* and will appear in an early issue.

Some Magnetometer Observations in the Coastal Plain Area of South Carolina. A paper presented to the North Carolina Academy of Science at Davidson, N. C., May 5, 1933, which, in a much enlarged form, is being prepared for publication.

A continuation of the research into the general subject of the physical properties of sand grains is being carried on, and further magnetometer work is also going forward.

DEPARTMENT OF HISTORY AND GOVERNMENT

W. W. Pierson, Jr., read to the seminar in Hispanic-American history of George Washington University the following papers: The Constitutions of Venezuela and The Church in Venezuela. These papers will be published.

He has continued his work on Henry Harrisse.

He is directing the research of DAVID A. LOCKMILLER (doctoral dissertation) on The Second United States Intervention in Cuba.

KEENER C. FRAZER has completed a study of the question of the international control and supervision, by agencies of the League of Nations, of agreements concerning the reduction and limitation of armaments.

PROFESSOR FRAZER is engaging, with the advice of members of the League of Nations Secretariat, in the study of the development of a treaty-making procedure by the League of Nations.

He is continuing his investigation of the public career of Senator John T. Morgan, of Alabama. The emphasis in this inquiry is upon those interests and activities that touched the foreign relations of the United States.

W. S. JENKINS has continued his research in the field of American slavery theories.

He has also been engaged in researches dealing with legal problems incident to the amending process of American constitutions.

He has collaborated with the faculty of the Law School in publishing A Survey of Statutory Charges in North Carolina in 1933. 11 *North Carolina Law Review* 191-265, June, 1933.

C. C. CRITTENDEN expects to publish during the year:

The Commerce of North Carolina, 1763-1789.

CHARLES B. ROBSON has published:

The Papers of Francis Lieber. *The Huntington Library Bulletin,* 3, February, 1933.

CECIL JOHNSON has had accepted for publication the following articles: The Distribution of Land in West Florida, by the *Louisiana Historical Quarterly.*

Expansion in West Florida, by *The Mississippi Valley Historical Review.*

J. C. RUSSELL has published during the year:

Hereford and Arabic Science in England about 1175-1200. *Isis,* July, 1932.

The Procedure of Medieval Assemblies. A paper read before the Medieval Section of the American Historical Association, at Toronto, December, 1932.

The Early Life and *Adiutores* of Robert Grosseteste. An article accepted for publication by the *Harvard Theological Review.*

The Medical Writers of Thirteenth-Century England. Accepted for publication by the *Annals of Medical History.*

The following doctoral dissertations were completed during the year under the supervision of the Department:

Herbert Dale Pegg. The Whig Party in North Carolina, 1834-1861. (Under the direction of R. D. W. Connor.)

In North Carolina, as elsewhere in the United States, the opponents of Andrew Jackson began to assume the name Whig during the spring of 1834, and the term Whig party became current in the state within the next six months. Although the policies of Jackson were mainly responsible for the origin of the local Whig party, the refusal of the east to permit constitutional reform before 1835 was also an important factor. The old Federalist element constituted the nucleus of the new party, which contained a large proportion of the business men in the east, a good many planters in the same section, and a majority of the merchants, mechanics, and farmers in the west. Thus, the west became a source of Whig strength, but a number of coastal counties were always definitely Whig.

The attitude of the Whigs on the leading issues before the state and country has received special emphasis throughout this study. Interested in the advancement of economic, educational, and social advantages, the Whigs consistently supported the principle of state aid for internal improvements and public education and led the movement for the establishment of eleemosynary institutions. In 1848, however, they vigorously opposed an extension of the suffrage, an issue advanced by the Democrats, but in 1860 they zealously advocated the principle of *ad valorem* taxation. With respect to federal issues, the local Whigs usually adhered closely to the views of their party nationally.

Whig newspapers and other campaign literature have been examined in order to obtain an understanding of the means of publicity at the command of the party. The various party organizations have been considered, with a description of each and an estimate of the contribution to the strength and efficiency of the Whig party. The campaigns and elections, state and federal, have been treated separately, while the campaign methods and the activities of the party organizations, as well as those of the candidates, have been described and illustrated. A comparative study of the elections has been made, which gives the relative strength between the Whig and the Democratic parties at regular intervals and indicates their gains and losses over former elections.

The political fortunes of the Whig party in North Carolina fell into two distinct periods. From 1836 to 1850 the Whigs were dominant, but after the latter date they were in the minority. In the main, the Whigs owed their long tenure of office to their interest in local affairs, to their attitude toward the federal issues of the day, to a large group of strong leaders, and to the extreme conservatism of the Democrats. After losing control of the state in

1850, the Whig party continued to decline, and in 1855 the vast majority of its members entered the Know-Nothing party, where they remained until the revival of the Whig party in the state in 1859.

Although a wide variety of factors contributed to the decline and fall of the local Whig party, these were, in the order named, the main ones. (1) The opposition of many northern and western Whigs to the extension of slavery and the division of North Carolina Whigs over the power of Congress to regulate slavery in the territories; (2) the decay and abandonment of the national Whig party; (3) the decline in the quality of Whig leadership locally; and (4) the adoption of a progressive program by the Democrats.

CHARLES NEWTON SISSON. The Creation, Organization, and Mobilization of the Army of the French Revolution, October 1, 1789, to April 20, 1792. (Under the direction of M. B. GARRETT.)

The purpose of this intensive study has been to trace the constitutional basis, the creation, the reorganization, the administration, and the mobilization of the "Army of the French Revolution" from the date of the formation of the *Comité Militaire* on October 1, 1789, to the outbreak of the war on April 20, 1792. Because of the nature and scope of the study, only a few of the major features can be pointed out briefly.

In the study of "the army under the ancient régime," the best French military authorities have been utilized in correcting prevalent errors with respect to the methods of recruiting, organization, discipline, and promotion, relative size of components, and administration of the army under the "ancient system."

An exhaustive study of the *cahiers* of the three orders has afforded very significant material for a consideration of the suggestions and recommendations for "reform" in the army. Apparently this feature of the study is quite unique in its presentation of the many recommendations which have not been taken up by others in the consideration of the military history of the Revolution.

The phase of the study which is devoted to the creation of the *Comité Militaire* and the *Constitution Militaire* presents certain outstanding ideas on the constitutional formation of the army that have not been delved into by writers on this aspect of the military history of France. In this phase of the research special attention has been given to certain important reports of the *Comité Militaire*.

Writers on the French Revolutionary army have been content to accept that an army "existed" without making any effort to explain its origin and early history. The study of the creation of this army and the reorganization of the different branches of the service involves an understanding of military terminology and technique which can be properly evaluated only by the military expert who is familiar with the tables of organization of both the French and American armies.

In an interpretation of "the spirit of the army," an effort has been made to trace the relation of the political "swing to the left" to the general discipline of the troops. This feature of the study has as its chief objective the task

of showing the extent to which the radicalism of the press, in the Jacobin Club of Paris and in the Assemblies, affected insubordination in the ranks of the army, which reached its climax of disaffection in the Nancy affair of August 31, 1790.

With respect to the plans for the actual mobilization of the total national force, the writer has presented the detailed formation of the "four armies," and has shown the status and relations of the regular army and national guards that had been consolidated into one *Grande Armée Francaise* at the opening of 1792.

In toto, the work is a comprehensive and intensive study of the creation, formation, and mobilization of that army which later challenged the minds and imagination of the peoples of Europe and the world. This history, however, is not merely military, for the inception and formation of the new army are considered with due regard for the political, social, economic, religious, and intellectual concepts of the people who composed its ultimate personnel.

Marvin Lucian Skaggs. North Carolina Boundary Disputes Involving her Southern Line. (Under the direction of H. M. Wagstaff.)

Boundary disputes characterized the history of North Carolina during practically the whole of the eighteenth century and the first quarter of the nineteenth, and they have recurred at intervals down to the present time. The question of a dividing line between North and South Carolina appeared as early as 1713, though a consciousness of separation was evident in the last quarter of the seventeenth century. The principle of geographical determinism forced this consciousness upon the minds of officials and inhabitants. Topographical features of Carolina served to encourage a division. Divergent racial settlements and different economic interests helped to create a spiritual separation of the province which preceded and accompanied a physical division. Though the controversy only reached the stage of agitation during the Proprietary period, definite action toward physical division appeared immediately after the purchase of Carolina by the Crown in 1729. The first survey was made near the seacoast in 1735. Agitation for extensions recurred at intervals until 1815, when the last section of the line separating the Carolinas was run and marked. Confusion frequently reappeared over various portions of the boundary line and re-surveys were made as late as 1928.

The dispute between North Carolina and Georgia did not appear during the colonial period, as the two governments did not claim adjacent territory until Georgia obtained the land cession by the Federal Government in 1802. After 1803 the dispute grew in intensity until the boundary was settled to the Tennessee border. Confusion and its accompanying demands for re-surveys have appeared during the nineteenth century.

These controversies affected practically every phase of the life of the political units concerned. The surrender of the Carolina charter was hastened; the granting of land in the region of the boundary was checked by the uncertainty of title and tenure; the settlement of the territory was retarded; agricultural and commercial life was affected; and the revenue systems were

disturbed, tax collections being at times impossible. The judicial systems of all the governments were often thrown into confusion; courts were occasionally broken up and magistrates imprisoned; militia service was seriously affected. Indian relations with the colonies were often disturbed, embittering relations between adjoining colonies whose rivalry over control of tribes was keen. As a result of all of these problems, normal functions of the governments concerned were disturbed. South Carolina lost a chief executive, and the Georgia legislature experienced confusion over membership in and attendance on its sessions. Imperial relations were disturbed during the colonial period over the question of the location of the boundary and the payment of costs of the surveys. This was particularly true in 1773, and North Carolina's bitterness helped to prepare the soil for the events of two years later. After the Revolution agreements were more satisfactory, the reason for which is easily seen. The Crown's practice of arbitrarily directing the location of boundaries, which were usually unsatisfactory to one of the colonies concerned, was eliminated. Negotiations between the states were more lengthy; the United States Congress was even drawn in by requests of a state government to intervene and effect a settlement. Once an agreement was reached, however, there was no question of coöperation in the survey.

Settlements were usually compromises, North Carolina being in a better bargaining position than South Carolina during the colonial period on account of the injustice of the Granville grant. After the Revolution the advantage was more nearly equal. The controversies were often accompanied by violence and bloodshed.

The following master's theses were completed during the year under the supervision of the Department:

VERA KATHERINE DIXON. The Contest in Congress and in Court over the Reed Parliamentary Rules. (Under the direction of W. W. PIERSON, JR., and W. S. JENKINS.)

Obstruction in the House of Representatives, consisting mainly of dilatory motions and refusal of admittance of presence, developed during the nineteenth century to the extent that the majority party was scarcely able to legislate. In 1890 Thomas Brackett Reed, using high-handed methods, overthrew century-old precedents and, with the coöperation of his party, established parliamentary rules giving much power to the Speaker, committees, and majority party.

Serious criticism of Reed's new method of counting a quorum resulted; but in 1892 the Supreme Court vindicated Reed's parliamentary rules, and the Democratic House in 1894, confronted by no quorum, was compelled to adopt the Reed Rules.

Under the practice of the Reed Rules the power of the Speaker became so great that Republican insurgents joined the Democrats in 1910 to curb the Speaker's power, with the result that in 1911 the Speaker was completely shorn of it.

Elizabeth Ferguson. A Critical Study of the Rioting in Paris during the Month of July, 1789. (Under the direction of M. B. Garrett.)

Out of these riots and the fall of the Bastille have arisen numerous legends. This critical study is an attempt to correct false impressions created by these legends and to give an accurate description of what actually occurred from June 30 to July 17, 1789. It is also an attempt to give an account of the actions of the Parisians and the intriguers at the royal court.

Mary M. Hicks. The Vicomte de Mirabeau. (Under the direction of M. B. Garrett.)

Contemporaries were unkind to the brother of the great Mirabeau. That the Vicomte was notorious for his inebriety and attendant levities there can be no doubt, but he was not merely a buffoon. The records show that on several occasions he made worthy contributions to the debates of the National Assembly. He deserves, therefore, at least a partial rehabilitation. This need the present thesis attempts to supply.

James Logan Godfrey. Reforms in Criminal Procedure during the French Revolution, 1789-1792. (Under the direction of M. B. Garrett.)

This is a preliminary study of the important changes which occurred in criminal procedure in France from 1789 to 1792. It includes a brief survey of the old procedure, agitation for reform, introduction of grand and petit juries, reorganization of the tribunals with the installation of the justices of the peace, elective judges, and the differentiation between the executive and judicial branches of government. Great emphasis has been placed on the social and political connotations of the question. The reforms in criminal law reflected accurately and sensitively the progress of the Revolution, and established the basis of modern French criminal justice.

Lawrence F. London. Sectionalism in the Colony of North Carolina. (Under the direction of C. C. Crittenden.)

Sectionalism in North Carolina had its origin in the geographic, economic, and social differences between the various parts of the province. It retarded the natural growth of the colony and, at one time, almost paralyzed the instrumentalities of government. There were no important sectional controversies in the colony until after the settlement of the Cape Fear region, which took place about 1725. Soon after the settlement of this region there developed a strong sectional rivalry between it and that northern part of the province known as the Albemarle section. During the period 1725 to 1765 there were two important sectional controversies. They were the ones over representation in the colonial assembly and the quarrel over the location of the colonial capital.

After 1750 the back country of North Carolina began to be fairly well settled, but it was not until about 1765 that east-west sectionalism began to

make itself felt. The first important east-west struggle was concerned with the erection of the governor's palace. The most important sectional controversy in the history of the colony was the famous war of the Regulation which culminated in the Battle of Alamance in 1771.

EUGENE FREDERICK MCCULLOUGH. The Federal Revolution and the Constitution of 1864 in Venezuela. (Under the direction of W. W. PIERSON, JR.)

This study is an attempt to present the cause, process, and outcome of one of the many revolutions characteristic of Latin America.

After a brief sketch of the early history of the Venezuelan Republic, the federal revolution is discussed under three divisions: (1) the period of conservative rule, (2) the era of the Páez Dictatorship, and (3), parallel to these periods, the rise and development of the federal or revolutionary group. The resulting constitution, of which a translation is included, is discussed, with the conclusion that the long struggle accomplished little more than the establishment of a new party in power and the formal adoption of a constitution with federal principles.

KATHERINE SMEDLEY. The Northern Teacher on the South Carolina Sea Islands. (Under the direction of J. G. deR. HAMILTON.)

This thesis attempts to present a picture of the Sea Islands of South Carolina from 1862 until 1870. As it is based on the diaries of two northern teachers of the freedmen, Martha Schofield and Annie Heacock, chief attention is necessarily given to the white teachers and to the Negroes. The other elements of the population are included only in order to complete the setting. The thesis further attempts to show the results of an application of the theories of the violent anti-slavery group upon the recent victims of slavery themselves. It aims to be not merely an educational study but a social one as well.

SARAH WOODALL TURLINGTON. Steam Navigation in North Carolina Prior to 1860. (Under the direction of F. M. GREEN.)

This thesis is divided into three sections. The first is a discussion of the formation and development of navigation companies which made possible the development of steamboats; the second is connected with the growth of steam navigation on the Cape Fear River; the third includes the growth and decline of steamboats on the sounds and the Roanoke, Tar, and Neuse rivers.

It was concluded that navigation companies did aid in the development of steamboats, that the Cape Fear River was economically the most important highway of travel in the state prior to 1860, that steam navigation on the sounds and the Roanoke, Tar, and Neuse rivers never attained the importance merited by the Cape Fear, and that railroads superseded steam navigation as a means of transportation in North Carolina.

THE SCHOOL OF LAW

Members of the faculty of the Law School coöperated in the preparation of an article entitled Proposals for Legislation in North Carolina, 11 *North Carolina Law Review* 51-78, December, 1932.

At the close of the legislative session they coöperated in the preparation of an article entitled A Survey of Statutory Changes in North Carolina in 1933, 11 *North Carolina Law Review* 191-265, June, 1933.

M. T. Van Hecke has published during the year:

Ernst Freund as a Teacher of Legislation. 1 *University of Chicago Law Review* 92, May, 1933.

J. H. Chadbourn has published during the year:

Lynching and the Law. 213. Chapel Hill: University of North Carolina Press. 1933.

A study of the operation of the judicial process and of special legislation in connection with lynchings, with a suggested model statute.

Frederick B. McCall has published during the year:

A New Intestate Succession Statute for North Carolina. 11 *North Carolina Law Review* 266-299, June, 1933. (In collaboration with Allen Langston.)

This article proposes a new intestate succession statute for North Carolina, which, if adopted, would effect desirable changes in the laws regulating the descent and distribution of a decedent's property. Among the important changes suggested are the abolition of the common law estates of dower and curtesy, the removal of the distinction between real and personal property for devolution purposes, and the distribution of the estate among the nearer and more dependent relatives of the deceased. The effect which the adoption of the proposed statute would have on the present North Carolina law is discussed in detail.

DEPARTMENT OF MATHEMATICS

Archibald Henderson presented to the Mathematics Section of the North Carolina Academy of Science at its meeting in May, 1932, a paper: An Expanding Universe and the Age of the Earth. This paper was originally delivered before the Sigma Xi Society, University of North Carolina, on November 15, 1932.

Professor Henderson delivered the annual address before the Pi Mu Epsilon Society of Duke University, March 1, 1933, on the subject, Implications of Modern Science.

E. L. MACKIE presented the following paper to the American Mathematical Society at its meeting in Atlantic City in December, 1932:

On Minimizing the Quotient of Two Definite Integrals.

L. L. GARNER read the following paper before the North Carolina Academy of Science:

Certain Conics Associated with Non-singular Correlations in the Plane.

These conics, a point conic and a line conic, are obtained by requiring a point (line) to lie on its corresponding line (point), defined by a correlation of points and lines of a plane. The transformation is reduced to a certain canonical form, and a classification is made according to the rank of the matrix obtained by imposing the conditions for points of a double pair. These latter conditions lead to a characteristic cubic, which is a reciprocal equation, the roots of which may be listed as: (A) 1, 1, 1; (B) 1, —1, —1; (C) 1, r, 1/r. Cases (A) and (B) are each divided into two subdivisions. In the first and last cases, the conics are non-degenerate, whereas in case (B) they are degenerate.

The following doctoral dissertation was completed during the year under the supervision of the Department:

GEORGE WILSON NICHOLSON. The Generalized Form of the Lorentz Transformation. (Under the direction of ARCHIBALD HENDERSON.)

In the preliminary portion of this thesis a careful historical study is made of the developments and experiments in modern science, especially in the field of electromagnetism, which gave rise to the formulation of the Theory of Special Relativity by Albert Einstein on the basis of the Lorentz Transformation. A minute and detailed study, in logical sequence, is made of the Lorentz Transformation in one dimension, on the assumptions laid down by Einstein and other workers in the same field.

The equations of the Lorentz Transformation, on like assumptions, are next derived for 2-dimensional and 3-dimensional space. All special cases are developed in complete detail. The Lorentz Transformation is then generalized for n-dimensional space.

Considerable attention is next devoted to the application of these generalized forms of the Lorentz Transformation to special problems of particular interest, involving unaccelerated motions in the different spaces. Problems in mechanics and ballistics are treated of in detail, revealing the elegance of the methods employed and the effectiveness of the Lorentz Transformation in the solution of these problems.

The following master's theses were completed during the year under the supervision of the Department:

HARRIET BRYCE HERBERT. Geometric Conditions That Determine a Conic. (Under the direction of J. W. LASLEY, JR.)

The first part of this paper is a study of the geometric relations stated in problems on determining conics. The problems are taken from a number of the leading books on projective geometry. The given relations are classified as to the number of conditions on the conics and the degree of the conditions involved. It is shown to what extent conics are determined by 1, 2, 3, and 4 conditions respectively, and that five conditions completely determine a conic.

In the final chapter, and comprising more than half of the entire paper, is a classified list, with solutions, of problems in which a conic is completely determined. Reference is given with each problem to the book, or possibly to several books, in which it may be found.

Hubert Vern Park. Analytical Criteria for Geometrical Conditions. (Under the direction of J. W. Lasley, Jr.)

Some of the most important geometrical conditions are treated analytically. The conditions arising from the study of conics are presented from two points of view, first, as referred to a Cartesian rectangular reference frame; and, second, as referred to a projective reference frame. Some of the conditions are the same but were derived by two different methods. The conditions for united position in the plane and in space from the projective viewpoint, and some important geometrical conditions arising from the study of binary forms were presented in the latter part of the thesis.

Sidney Goldwater Roth. The Method of Abridged Notation. (Under the direction of J. W. Lasley, Jr.)

In this paper some of the many uses of the methods of abridged notation are presented. First, the technique is applied to linear equations, by means of which some of the more important relations between linear functions are derived. Then quadratic forms are treated through this elegant analytical approach. Emphasis is placed upon systems of conics and their relations to intersecting lines or conics. Chasles's and Pascal's theorems are proven in connection with systems of conics; and the three degenerate conics of the system $S - k S^1 = 0$ are determined. Finally, curves of higher order are considered. In this case, emphasis is entirely upon the forms of the various n -ics which are discussed.

James Graham Wall. Existence Theorems and Certain Applications for Ordinary Differential Equations. (Under the direction of E. L. Mackie.)

A short introduction, together with a brief historical account of the development of differential equations, is given in order to show the necessity for theorems concerning the existence and uniqueness of the results of certain mathematical processes in a given field or branch of mathematics, and, in particular, to show the needs of existence theorems for ordinary differential equations.

Existence theorems are given for ordinary differential equations of the following forms:

$$(1). \quad \frac{dy}{dx} = f(x, y),$$

$$(2). \quad \frac{dy_i}{dx} = f_i(x, y_1, y_2, \ldots, y_n), \quad (i = 1, 2, \ldots, n),$$

$$(3). \quad f(x, y, \frac{dy}{dx}, \ldots, \frac{d^n y}{dx^n}) = 0,$$

in which the right-hand members of equations (1), (2), and the left-hand member of equation (3) are analytic when the variables are restricted to certain regions or neighborhoods.

A few problems are solved in order to illustrate how many practical problems lead to the formulation and solution of ordinary differential equations.

WILLIAM RAE WALL. Elementary Invariants. (Under the direction of J. W. LASLEY, JR.)

The object of this paper is to assemble and interpret geometrically invariants of elementary mathematics. The material is divided into three parts. The first division deals with invariants under the transformation of oblique coördinates. The second division deals with invariants under a rigid motion of rectangular coördinates. The last division involves some invariable properties under translation of point sets determined by the linear, quadratic, cubic, and quartic functions.

DEPARTMENT OF PHARMACOLOGY

WILLIAM DEB. MACNIDER has published during the year:

Concerning Tissue Resistance. *Southern Medicine and Surgery,* XCIV: 10. October, 1932.

Relationship Between Acute Liver Injury Induced by Alcohol, Retention in Plasma of Phenoltetrachlorphthalein and Elimination of Phenolsulphonephthalein. *Proceedings of the Society for Experimental Biology and Medicine,* XXX: 78. 1932.

The Acquired Resistance of an Altered Type of Liver Epithelium to Uranium Nitrate and to Chloroform. *Proceedings of the Society for Experimental Biology and Medicine,* XXX: 238. 1932.

Concerning the Naturally Acquired Resistance of the Livers of Certain Senile Dogs to Alcohol and to Chloroform. *Proceedings of the Society for Experimental Biology and Medicine,* XXX: 237. 1932.

Cytological Basis for Certain Functional States. *Journal of the South Carolina Medical Association,* XXVIII: 12. December, 1932.

SCHOOL OF PHARMACY

J. G. Beard has published:

The National Pharmaceutical Syllabus, 4th edition. Baltimore: Lord Baltimore Press. An outline of study embracing a four-year curriculum and leading to the degree of Bachelor of Science in Pharmacy. Authorized and sponsored by the three national pharmaceutical associations including the American Association of Colleges of Pharmacy. Prepared and published by a committee of twenty-one pharmacists who had as collaborators thirty teachers and board examiners, all working under the chairmanship of J. G. Beard.

The *Pharmaceutical Syllabus* is intended to indicate the subject matter that schools of pharmacy may profitably teach, and to set forth that portion of the subject matter which should be required and that portion which may be looked upon as optional, as well as to indicate the minimum amount of time that should be spent in presenting such material to students. The *Syllabus* is intended also as a guide to state board examiners in that it indicates the nature and extent of professional and applied knowledge that may have been included in the training of the graduate in pharmacy. The *Syllabus* is not designed to interfere with such flexibility in courses of study and freedom in methods of instruction as ought to exist in schools of pharmacy, but rather its purposes are (1) to present the essentials that should be included in college curricula; (2) to outline subjects of a professional or applied character in such a way as to foster a degree of uniformity which will tend to equalize the training of pharmacists sufficiently to assure their professional capability, irrespective of the geographic location of the teaching institution or its educational policy; and (3) to give in the several outlines such attention to detail as will guide boards in framing their examinations. In short, the plan and scope of the work contemplate a series of suggestions and outlines that may serve as a rational basis for instruction and that will afford scientific tests to determine the fitness of applicants seeking license as pharmacists.

H. M. Burlage has completed the following studies during the year:

Determination of Santonin in Fatty Mixtures.

The method of Claus has been modified with encouraging results and is now being subjected to a collaborative study with the possibility of inclusion in the Methods of the Association of Official Agricultural Chemists.

Professor Burlage has been engaged in the following studies during the year:

A Survey of Drugs and the Drug Industry of North Carolina. (With M. L. Jacobs.)

The Constituents of White Snake Root and their Pharmacological Action. (With WM. DEB. MACNIDER.)

The Assay of the Official Sulfur Ointments.

Phytochemical Studies of *Eremocarpus setigera.*

Examination of the Volatile Oil of *Heracleum lanatum.*

PROFESSOR BURLAGE published the following article:

The Development of Modern Drugs. *Carolina Journal of Pharmacy,* XIII: 233, 252; XIV: 3. 1933.

M. L. JACOBS has completed the following study:

The Determination of Strychnine and Brucine in Nux Vomica by a Methoxy Difference Method. *Journal of the American Pharmaceutical Association,* XXII: 4. April, 1933. (With H. M. BURLAGE.)

PROFESSOR JACOBS has been engaged in the following studies during the year:

A Survey of Drugs and the Drug Industry in North Carolina. (With H. M. BURLAGE.)

A Study of Some New Solvents in Alkaloidal Assaying.

DEPARTMENT OF PHILOSOPHY

The following master's thesis was completed during the year:

ALICE EVAN WALKER. What is Education? (Under the direction of H. H. WILLIAMS.)

The purpose of this study is to make clear the nature of education. Education is defined as a relating process. It relates the individual to knowledge. There are three steps in this process. The first step is the relating of the individual to knowledge of reality as form; the second is the relating of the individual to knowledge of reality as process; the third, which is the relating of the individual to knowledge of reality as the synthesis of form and process, completes the process.

DEPARTMENT OF PHYSICS

OTTO STUHLMAN, JR. directed the publication of the following articles:

Magnetic Field of a Solenoid Oscillating at Radio Frequencies. *Review of Scientific Instruments,* III: 561. 1932. (With SHERWOOD GITHENS, JR.)

For abstract see *Research in Progress,* 1932.

The High Frequency Magnetic Field of a Flat Spiral Coil. Submitted for publication, June, 1933. (With Sherwood Githens, Jr.)

The high frequency magnetic field of a flat spiral coil, with an inner opening about one-fourth the diameter of the coil, was excited by a single-tube tuned plate-tuned grid and push-pull oscillators. Frequency range 1,500 to 6,000 kc/sec. The magnetic fields thus excited were compared with the fields produced by a direct current. The results when a push-pull oscillator was used to excite the high frequency field showed no apparent difference, except near the far edges lying about 25 cm. from the center of the coil, and were independent of frequency.

Unbalanced high frequency excitation showed magnetic field crowded toward the normal axis when filament lead was connected to inner turn of spiral. Field strength across inner diameter was found to be non-uniform when field was excited by a balanced push-pull oscillator. Field strength along normal axis of coil diminished more rapidly for balanced than for unbalanced excitation, independent of method of lead connections.

Professor Stuhlman has the following studies under way:

(With M. McCay.) The Intensities of the Alpha, Beta, and Gamma Lines of Hydrogen as a Function of Pressure and Frequency of Excitation in the Electrodeless Discharge.

(With J. S. Guyton.) Experimental study of intensity across the image of a slit as a function of slit width.

(With E. Scott Barr.) The intensity of the Balmer Series in the ultra-violet in relation to the many-lined spectrum of hydrogen.

The general problem of the intensities of spectral lines is being investigated as excited by the electrodeless discharge in electrical fields. The variables now under consideration are influence of pressure and frequency of excitation. These studies are made possible through grants in aid of pure research by the Rockefeller Fund, the Smith Fund, and the National Research Council, to whom is expressed much appreciation for their assistance.

E. K. Plyler has completed the following research:

The Infrared Absorption Spectra of HBr. (With E. F. Barker, of the University of Michigan.)

Previous work on the absorption of the HBr gas has been extended by measuring the first harmonic band in the region of 1.96 μ. Six lines of the positive and negative series were found. These data made it possible to calculate the moment of inertia and other constants of the HBr molecule more accurately than before. The fundamental band was also studied, and twelve lines of the positive and negative series were found. These lines showed a double structure, and this was found due to the two isotopes of bromine.

The Effect of Temperature on the Infrared Absorption of Calcite.

The infrared absorption bands of calcite are usually double, and this is interpreted as due to two energy levels of the molecules. The present work was carried out to see if the bands changed in relative intensity at different temperatures. It was found that the higher energy band always decreased in intensity more rapidly than the lower energy. At a temperature of about 800° C. both bands disappeared. This is probably due to the breaking up of the CO_3 ion.

PROFESSOR PLYLER is now studying the effect of certain dissolved substances on the absorption spectra of water.

The following master's theses were accepted by the Department during the year:

SHERWOOD GITHENS, JR. The Internal Magnetic Field of a Solenoid Oscillating at Radio Frequencies.* (Under the direction of OTTO STUHLMAN, JR.)

The internal magnetic field of a solenoid excited by high-frequency alternating current, frequently used in modern research, was investigated because published data on this subject were found to be indefinite and usually based upon analogy to the direct current field. Investigation showed this analogy to be justified and correct when the wave-form of the oscillator employed to excite the solenoid is "balanced"; i.e., one half of each cycle an exact duplicate of the other half. Balanced current from a push-pull vacuum tube oscillator produces a magnetic field in the middle portion of a long solenoid which is perfectly uniform in every respect. However, when the unbalanced current from a one-tube tuned plate-tuned grid oscillator is used, the field is unsymmetrically distributed in intensity and the lines-of-force show considerable distortion from the conventional form.

CLAUDE JACKSON CRAVEN. The Infrared Absorption of Nitrate and Carbonate Ions. (Under the direction of E. K. PLYLER.)

A study has been made of the infrared absorption spectra of a number of solutions. Almost all of the work has been done on the carbonate and nitrate groups. It was necessary to obtain very thin cells in the region of 7 μ. This was done by taking two sheets of mica and pressing them together after a small amount of the liquid had been placed between them. Potassium, calcium, lead, and copper nitrates were studied, and it was found that they had spectra which were similar. The similarity of the spectra in intensity and position indicates that the absorption is due to the NO_3 ion. The results for the carbonates also indicate that the absorption is due to the CO_3 ion.

E. SCOTT BARR. The Intensity of the Hydrogen, Beta, Gamma, and Delta Lines in the Balmer Series Excited by Electrodeless Discharge. (Under the direction of OTTO STUHLMAN, JR.)

* *Review of Scientific Instruments*, III: 561. 1932.

Variation in the intensities of these lines as a function of pressure and frequency of excitation were investigated. Pressure range 4-40 microns. Intensity of the lines passed through a minimum between 10 and 12 microns' pressure. At constant pressure and variable frequency of excitation, maxima and minima of intensity were found to exist at critical frequencies and their multiple values, showing a form of resonance.

R. D. Weatherford. Surface Energy of Dilute Electrolytes. (Under the direction of Otto Stuhlman, Jr.)

Bubbles bursting at the surface of a liquid eject small droplets to a height determined by the bubble diameter and kind of liquid. In this study dilute solutions of NaCl, LiCl, KCl, $NaNO_3$, $LiNO_3$, and KNO_3 are investigated for height of ejected droplets as a function of solution concentration. The data obtained are then interpreted in the light of modern theory of surface energy, showing the droplet heights to be proportional to the surface energy of the solution.

DEPARTMENT OF PHYSIOLOGY

E. W. McChesney is studying methods for the determination of the alpha-hydroxy acids derived from the alpha-amino acids (formed in the hydrolysis of proteins) by the action of nitrous acid. At present malic acid is being studied in particular, and preliminary reports of a method which is accurate within 3-6 per cent have been presented at several meetings.

DEPARTMENT OF PSYCHOLOGY

English Bagby is engaged in the writing of a text on Social Psychology.

The following doctoral dissertations were completed during the year under the guidance of the Department:

Henry Nelson DeWick. The Relative Recall Effectiveness of Visual and Auditory Presentation of Advertising Material. (Under the direction of H. W. Crane.)

The problem involved in this study was to discover the relative effectiveness of visual and auditory presentation of advertising copy when both are of similar type and content.

Seventy-three students in the elementary psychology class of the University were divided into two groups of thirty-six and thirty-seven. This was done by taking alternate names from an alphabetical list of students.

Fifteen written advertisements were prepared, each from seventy to eighty words in length and set in 14 point linotype Century expanded type, with the names of the products appearing three times in bold-face caps. Fictitious

trade names were used for all of the products. Each subject was given one minute in which to read each advertisement, after first being advised that he would be later called upon to reproduce the contents of the advertisements.

Another set of fifteen advertisements was prepared, similar in construction but with different trade names. These were read aloud to the auditory group from an adjoining room, connected with the experimental room through a loud speaker. Each auditory advertisement took forty-five seconds to present, and there was a pause of fifteen seconds between advertisements.

One recall examination was made immediately, another followed twenty-four hours later, another followed five days later, and a final examination was made five months after the original presentation of the material. After the five-day recall examination the two groups were reversed, the auditory group being tested with the visual presentation of advertisements and vice versa. The same recall examinations, at approximately the same intervals, were made.

The results may be briefly summarized as follows:

1. Auditory presentation of advertising copy is distinctly superior to visual presentation, when the problem involved is to recall the contents of the advertisements or the products and their trade names after a delay of from five days to five months.

2. After a delay of only twenty-four hours, auditory presentation is slightly better than visual presentation when the problem involved is the same as above.

3. When the problem is one of immediate recall of products and their trade names, the results are almost equal for both groups, though perhaps slightly better for auditory presentation.

4. When the problem is one of immediate recall of ideas expressed in the advertisements, the results show the auditory presentation to be distinctly superior to the visual presentation.

5. Partially correct recalls of products and their trade names, and confusions between trade names, occur as frequently with one medium of presentation as with the other. Therefore, these may be neglected in a study of the relative recall value of visual and auditory presentation.

GEORGE GLENN KILLINGER. Emotional Judgments of Music. (Under the direction of J. F. DASHIELL.)

The purpose of this investigation was to study the effects of ten musical compositions of the classical type, played upon a reproducing piano, upon the emotional judgments of college students over a period of ten days. Each day the subjects were given mimeographed sheets that contained nineteen classes of emotional words, one sheet for each of the ten compositions. Each subject was asked to encircle the emotional word that, in his judgment, appeared to be most appropriate for the particular composition then being presented. The subjects were also given small mimeographed booklets in which they were to rate daily the compositions as to agreeableness and familiarity.

The results showed: emotional judgments to a musical composition are very much alike for all individuals; the greater degree of musical training, the more uniform are the judgments, especially in the case of intricate compositions; the judgments become more uniform upon repetition of the compositions; the technique used in this experiment is statistically reliable as a means for measuring emotional judgments, as shown by the constancy of individual judgments from day to day; compositions were liked better after ten repetitions than when first presented; musical subjects are "intrinsic listeners," engrossed in the music itself, whereas the unmusical are "extrinsic listeners" and find music interesting only for its power of association or suggestiveness.

The following master's thesis was completed during the year under the guidance of the Department:

Blanche Zorn. Human Reactions in a Foot Maze. (Under the direction of J. F. Dashiell.)

By having a subject (blindfolded) try to walk on a bare floor the true path of a floor maze in which he had just had a trial (also blindfolded), it was hoped that a new method might be developed of getting at some of the more qualitative aspects of human maze learning.

Seven male college students served as subjects. The procedure consisted of one trial a day in the maze, followed by one floor tracing, until the maze had been learned. An introspective report was made by each individual at the completion of his learning.

Among the more outstanding results were the following: all of the subjects learned the maze in a piece-meal manner. The majority of them fixated first the turns near the entrance, then those near the exit, and last of all the ones in the middle. Blindfolded subjects, in general, were unable to make 90° turns. Most of the subjects used some form of verbalization in their learning.

SCHOOL OF PUBLIC ADMINISTRATION

A piece of research is in progress entitled, A Study of Some North Carolina Cities in the Depression: Asheville, Greensboro, Rocky Mount.

In each of the cities, a survey is made of the growth and development of the city, with enumeration and analysis of the problems that developed as a result of the depression, and enumeration and analysis of the measures taken to meet these specific problems. Special consideration is given to financial matters. The study is conducted by Chester F. Lewis, a graduate of the Massachusetts Institute of Technology and a civil engineer resident in Greensboro.

DEPARTMENT OF ROMANCE LANGUAGES

William M. Dey is bringing to completion certain studies relating to Stendhal and his contemporaries. It is expected that they will soon be ready for publication.

He is directing the following doctoral dissertations:

J. A. DOWNS. The Poetic Production in France during the Last Years of the Eighteenth Century.

J. L. SMITH. Emile Augier, Dramatist.

STURGIS E. LEAVITT has published:

A Tentative Bibliography of Peruvian Literature. 37. Cambridge: Harvard University Press. 1932.

Hispano-American Literature in the United States. A Bibliography of Translations and Criticism. x, 54. Cambridge: Harvard University Press. 1932.

A Tentative Bibliography of Bolivian Literature. 23. Cambridge: Harvard University Press. 1933.

He has in press:

A Bibliography of Colombian Literature. (In collaboration with CARLOS GARCIA-PRADA, of the University of Washington.)

He has in preparation:

A Bibliography of Hispano-American Biography and Literary Criticism.

PROFESSOR LEAVITT is directing the following doctoral research:

W. P. SMITH. Jesus Castellanos and his Works.

URBAN T. HOLMES, JR., has published during the past year:

Germanic Influence on Old French Syntax. II. *Language,* IX: 162-170. (With ELOISE VAUGHAN.)

Old French *fauterne,* Provençal *falterna. Romanic Review,* XXIV: 133. 1933.

A History of the French Language. Columbus, Ohio: H. L. Hedrick. 1933. (With A. H. SCHULTZ.)

PROFESSOR HOLMES has completed A History of Old French Literature, Origin to 1300. He has also completed an edition of the works of Du Bartas. (With J. C. LYONS and R. W. LINKER.)

The Waldensian *Patois* in North Carolina. (Accepted for publication in *Zeitschrift für romanische Philologie.*)

A series of studies on the non-Latin elements in the French vocabulary. (Accepted for publication in *Speculum.*)

He has in progress:

Medieval Gem Stones.

He is directing the following doctoral dissertations:

J. D. Bounous. The Waldensian *Patois* preserved in the State of Missouri.

D. E. Frierson. The Franco-Genoese Dialect of the *Chansons de Geste.*

Charles Neal. A Balzac Dictionary.

Ida Patrick. A Study of *La Chronique de Normandie.*

L. B. Stabler. Studies in Middle French Syntax.

N. B. Adams is directing the following doctoral dissertations:

Myra L. Yancey. The Literary Technique of Pardo Bazán.

J. A. Thompson. The Influence of the Elder Dumas in Spain.

Professor Adams is continuing his studies on the theatre of the Romantic Period in Spain.

H. R. Huse has published *The Illiteracy of the Literate—A Guide to the Art of Intelligent Reading.* New York: D. Appleton-Century Co. 1933.

A work on the psychology of speech.

He is working at present on the social and political criticism of Anatole France.

R. S. Boggs has published:

The Half-Chick Tale in Spain and France. A monograph published as *Folklore Fellows Communications,* No. 111. Helsinki. 1933.

A paper based on the monograph was delivered before the Folklore Section of the Modern Language Association in New Haven, Conn., in December, 1932.

Professor Boggs has completed four articles on *Gans, Geld, Haar, Handel* to be published in the *Handwőrterbuch des deutschen Märchens.*

Notes on the American section of Johannes Bolte's bibliography (vol. 5) to his *Anmerkungen* to Grimm's fairy tales will appear in the *Journal of American Folklore.*

He is working on folklore in the *Celestina,* and studying the manuscripts of the *Poema de Alfonso Onceno.*

The following doctor's dissertations are in progress under his direction:

T. E. Wright. Index of French Folktales.

D. F. McDOWELL. Verbal Etymologies in the *Grande e general Estoria* of Alfonso the Wise.

F. C. HAYES. Folktale Motives and Proverbs in the Spanish Golden Age Drama.

STERLING A. STOUDEMIRE has completed the following research:

Gil y Zárate's Translations of French Plays. *Modern Language Notes,* XLVIII: 321-325. 1933.

Dionisio Solís' *Refundiciones* of *Siglo de Oro* Dramas. Paper read before the Spanish Section of the Modern Language Association, New Haven, Conn., December, 1932.

W. L. WILEY read a paper, Translations of Ovid in the French Renaissance, before the Renaissance Section of the Modern Language Association of America at its New Haven meeting in December, 1932.

He has had accepted for publication by the *Romanic Review* Pierre Le Loyer's Version of the *Ars Amatoria.*

He has in progress:

The Love-Tales of Antoine de Baif.

He is directing the following master's thesis:

ANNA MARY SANFORD. Symbolism in the Drama of François de Curel.

The following doctoral dissertations were completed during the year under the guidance of the Department:

JOSÉ MIGUEL GALLARDO. The Individuality of Baltasar Gracián. (Under the direction of S. A. STOUDEMIRE and S. E. LEAVITT)

The aim of this study has been to bring to light the individual aspects of the life and works of Baltasar Gracián (1601-1658). The facts of his life were first examined to ascertain his individuality as a man, and from existing biographical information it is shown that, although by training and discipline Gracián should have been submissive to authority, he did not hesitate to defy his superiors when they interfered with his literary activities. While commentators have been inclined to see in Gracián's literary work a mosaic of a large variety of sources, it is evident that Gracián skillfully blended the material that he culled from others into a body of ideas that has come to be identified with his personality. On vital issues of the day, Gracián took a decidedly non-conformist attitude. Almost alone in the seventeenth century, he dared to satirize its evils. The church to which he had pledged allegiance as a Jesuit priest was not without faults, and he censured churchmen and their practices. Gracián had definite ideas as to what constituted artistic style, and he made every effort to adhere to these ideas. The virtues and defects of his conception unite to form a style that cannot be confused with that of any

other writer of the day. Finally, Gracián's literary comments demand attention as an expression of his individuality. He was as unorthodox in judging authors as he was in other matters; the dictates of fame meant nothing to him. He was one of the first to adopt definite standards of literary excellence in Spain, in which respect he may be considered a precursor of the critics of the eighteenth century. In conclusion, Baltasar Gracián is one of the most individual writers in Spanish literature. This individuality is manifest in his life and in the different aspects of his works touched upon above: in his use of sources, in his ideas, in his style, and in his unusual literary criticism.

ROBERT WHITE LINKER. *La Chevalerie de Ogier de Danemarche* (Lines 1-6,000). A Critical Edition, with Notes, Variants, and Glossary. (Under the direction of URBAN T. HOLMES, JR.)

This edition presents a text established from manuscript B (with variants from the other manuscripts) according to the method given by Professor Joseph Bédier in his *Lai de l'ombre*. It thus brings up to date the first half of one of the leading *chansons de geste* previously edited by J. Barrois in 1842.

WILLIAM MILTON MCLEOD. The *Consaus d'amours* and the *Poissance d'amours* of Richard de Fournival. (Under the direction of URBAN T. HOLMES, JR.)

This is an edition of two hitherto unpublished prose works of Richard de Fournival, a well-known thirteenth century cleric, author, physician, and musician. There exist three manuscripts of the *Poissance*. Manuscript number 25566 of the Bibliothèque Nationale has been used. It has been reproduced exactly and variants of the other manuscripts have been given. There is only one manuscript of the *Consaus*, that which is also found in manuscript No. 25566 of the Bibilothèque Nationale. Such facts as are known about the life of Richard de Fournival have been gathered together and a few pages of the introduction have been devoted to that subject. Also in the introduction will be found a discussion of each of the manuscripts, together with some comments on and examples of the language of each. There is a summary of both the *Consaus* and the *Poissance*.

ARCHIBALD KENNETH SHIELDS. The Madrid Stage, 1820-1833. (Under the direction of N. B. ADAMS.)

This is a factual study of dramatic productions and companies in Madrid from 1820 to 1833, and of dramatic criticism for the last six years of that period.

There is included in the introduction a brief and tentative study of the epoch showing the preparation on the stage and in dramatic criticism for the advent of Romanticism.

Chapter I comprises a chronological list of dramatic productions, based upon theatrical announcements appearing in *El Diario de Avisos, La Gaceta de Madrid,* and *El Correo Literario y Mercantil.* Chapter II contains the lists of dramatic companies performing in Madrid. Chapter III gives in chronological order a list of newspaper articles dealing with the theatre, published in

the Spanish capital from 1828 to 1833. In the preparation of the last chapter the separate works of Mariano José de Larra: *El duende satírico del día* and *El pobrecito hablador* have been omitted, but with these exceptions the list of periodicals consulted is complete.

Following the body of the work are five indices. Index A is a bibliographical index to all plays listed in Chapter I, arranged alphabetically and including a synopsis of the presentations of the work throughout the period, and, when available, contemporary manuscripts and editions, notes concerning its authorship or origin, and contemporary critical references to it. B is an index to authors, translators, and adapters referred to in Index A. Index C lists the actors referred to in Chapter II. D indexes according to subject matter the critical articles considered in Chapter III, while Index E lists the authors of those articles.

The following master's theses were completed during the year under the guidance of the Department:

MILDRED GARNER BETTS. The Marriage of Ferdinand and Isabella as a Theme in Spanish Literature. (Under the direction of S. A. STOUDEMIRE.)

This thesis is an attempt to show what historical facts have been used in four Spanish plays treating of the marriage of Ferdinand and Isabella, how the authors have employed them, and how plays compare with each other.

With this purpose in mind, an introductory study of the history of Castile and Aragon during the years preceding the marriage of the Catholic rulers has been made. Each drama has been separately analyzed, and a comparison of the four made in the final chapter.

The conclusions reached are as follows: no one of the authors has used the same historical episodes in the same manner; each playwright has treated only the conspicuous historical incidents commonly known to the public; all of the writers have introduced pseudo-historical elements; each dramatist has taken his material from history or legend, and owes nothing to playwrights who preceded him.

JAMES YOUNG CAUSEY. A Critical Bibliography of the Spanish Theatre, 1850-1898. (Under the direction of S. E. LEAVITT.)

The purpose of this study is to list the critical material dealing with the Spanish dramatists of the period 1850-1898. No attempt has been made to classify or list the works of the dramatists themselves unless the volumes in which they are found contain biographical material or critical remarks on the theatre. This study is concerned solely with dramatic criticism, history of the stage, and biographies of dramatists.

LETITIA ASHLEY LEWIS. The Thesis Novels of Alfred de Vigny. (Under the direction of W. M. DEY.)

This is a study of Alfred de Vigny's thesis novels, *Stello* and *Servitude et grandeur militaires*, in which he champions the cause of the Poet and the Soldier.

A sketch of the development of the novel is given to show that though by the nineteenth century it was still free of all rules, the novel was sufficiently important to attract the attention of the poets of this period, who used it to extend the field of their influence.

Some discussion is given of the romantic background and life of Vigny, with more particular attention directed to the general ideas which preoccupied him in his poems, as these ideas reappear in his novels.

It is seen that Vigny's progress was methodical. *Cinq-Mars,* his first prose work, shows serious defects. As the intrigue was centered on historical characters, it gave Vigny no latitude for the free play of imagination. This fault was corrected to a certain extent in *Stello.* In *Servitude et grandeur militaires,* Vigny further corrected it by making his historical characters purely incidental.

The analysis of *Stello* and *Servitude et grandeur militaires* shows them to be novels in which Vigny elaborated two thoughts which run like a *leit-motif* throughout his work—the solitude of the man of genius and his need for pity and understanding.

The conclusion attempts to evaluate Vigny as a novelist. His conception is found superior to his execution. *Servitude et grandeur militaires* marks an improvement over *Stello* in simplicity, clearness, and evenness of tone. The stories, *Laurette ou le cachet rouge* and *la Canne de jonc,* show Vigny at his best as a story-teller and delineator of character.

Evans W. Lindsey. A Translation of the Greek Poems of Gilles Ménage. (Under the direction of Urban T. Holmes, Jr.)

This thesis consists of a translation of the Greek poems of the French scholar Gilles Ménage (1613-1692), which have not been translated hitherto. They consist chiefly of epigrams, epitaphs, and love-poems in imitation of Pindar and Anacreon. Following the translation is a brief criticism of Ménage as a writer of Greek poetry.

Leslie Mary Moss. The Celtic Element in Gallo-Romance. (Under the direction of Urban T. Holmes, Jr.)

This study was undertaken in order to bring up to date the material concerning the Celtic element in the Gallo-Romance vocabulary. No list of these Celtic words has been made since Thurneysen's *Keltoromanisches* in 1884. Recent etymological dictionaries give many new Celtic roots. A total of 428 French and Provençal words listed, of which 67 were of doubtful etymology, came from 274 Gaulish stems. These words were found to relate principally to the peasant or farmer class, and dealt primarily with agriculture, nature, and personal life. Only a few public words and abstract terms have survived.

Beverly Reid Thurman, Jr. Several Phases of the Exoticism of Théophile Gautier. (Under the direction of W. M. Dey.)

Théophile Gautier's exoticism is based upon a super-refinement of the senses, causing him to find life in France unharmonious. He hates this life and his compatriots and, as a means of escape, writes exotic literature in which

he seeks to reconstruct his ideal imaginary world. His exoticism may be classified as exoticism of place, time, and narcotic visions. His longing is for oriental lands, the world empires of the Egyptians, the Assyrians, the Babylonians, and the antiquity of the decadent periods. The typical narcotic vision is Gautier's principal means of escape. Gautier's exoticism leads him to a corruption and pessimism far removed from the faith and inherent optimism of other French Romanticists. Nevertheless, Gautier's style is classical and pure and his exotic evocations are full of form and harmony, for his highest ideal is the serene beauty of classic Greece.

PERCY WISE. The Survival of the Principal Old French Literary Types into the Fourteenth Century. (Under the direction of URBAN T. HOLMES, JR.)

The *chanson de geste,* the metrical romance, and certain types of lyric poetry are supposedly peculiar to the Old French period of French literature (1000-1300). It is true, however, that they continued to be written in a more debased form as late as the third quarter of the fourteenth century.

After a statement of the social and political conditions in the period 1301-1350, this thesis deals with the shift in interest and the consequent change of character in the romance and *chanson de geste* of this decadent period. Some of these poems are reworkings of the older works, but the majority of them are verbose additions to the earlier themes. The Alexander legend and the Crusade epics were both popular during this period. In the study of lyric poetry of the period, special attention is given to Guillaume Machaut, who transformed the old lyric *genres* into new types.

DEPARTMENT OF RURAL SOCIAL-ECONOMICS

E. C. BRANSON, until the time of his death on March 13, 1933, was continuing his researches in county government, in which he has made the greatest contributions in the fields of research and publications. He was also directing the following studies:

SARAH LEE BROCK. Onslow County: Economic and Social.

A library and field study of Onslow county, similar to many that have been made by the Department.

EDWARD A. TERRY. The Justice of the Peace Courts in the United States.

CARRIE B. WILSON. Country Schools of Permanent Influence.

A survey of outstanding country schools and school systems, with recommendations for North Carolina.

S. H. HOBBS, JR., is making a study of The Balance of Trade Against the South, under the auspices of the Institute for Research in Social Science. He is also compiling and editing, with the assistance of

W. P. Young, a report on the Major Economic Opportunities of the South for the Institute for Research in Social Science.

He has edited the *University of North Carolina News Letter,* twenty-five issues carrying economic and social studies of concern to the state.

Professor Hobbs is directing the following research:

J. H. Kirk. A Study of Farming and its Technical Lag in the Southeast.

This study covers such matters as the origin of tenancy, functions of landlord and tenant, the farm capital, systems of farming in various areas, importation of food into the Southeast, sources and cost of farm credit, technological deficiencies in farm operations, the place occupied by livestock, the production of food for the farm family, and several other aspects.

Don S. Matheson. History of Farm Organizations in North Carolina.

W. P. Young. History of Agricultural Education in North Carolina.

John M. Maclachlan. Mississippi: Economic and Social.

Similar volumes on Tennessee, by C. E. Allred; South Carolina, by S. M. Derrick; and Virginia, by Wilson Gee, have been reported, and are still being compiled under the general direction of S. H. Hobbs, Jr.

Paul W. Wager is continuing his researches in Forest Taxation for the Forest Taxation Inquiry, Forest Service, U. S. Department of Agriculture.

DEPARTMENT OF SOCIOLOGY

Howard W. Odum has published during the year:

Public Welfare Activities. Chapter XXIV in Vol. II of *Recent Social Trends in the United States.* Report of the President's Research Committee on Social Trends. 2 vols. New York: McGraw-Hill. 1933.

Recent Trends in the Application of the Social Sciences. *Social Forces,* XI: 477-488. 1933.

Professor Odum was assistant director of research of the President's Research Committee on Social Trends, the results of which have been published in two volumes (*Recent Social Trends in the United States*) and thirteen monographs by the McGraw-Hill Book Company.

PROFESSOR ODUM has been directing the research project, The Southern Regional Study: the South's Capacity for Social and Educational Development, a two-year program of study and research, under the auspices of the Social Science Research Council. The project is to be completed during the present calendar year.

This study, under way since January, 1932, is attempting to present a general picture or inventory of the natural resources and wealth of the region; of the South's use of science and technology in the development of these resources; of its relative status with respect to income, wealth, and other economic factors; of its population and human resources; and of its general culture and institutions.

In connection with the Southern Regional Study, PROFESSOR ODUM has been directing and supervising the following research projects:

ELMA ASHTON. Education in the South.

GORDON BLACKWELL. Public Relief in the South.

ELIZABETH HEAD. Religion and Religious Organizations.

JOHN MACLACHLAN. Analysis of the Socio-economic Characteristics of Mississippi.

HELEN IRENE MCCOBB. Regional Folkways.

MARTHA MCKEE. Agriculture and Optimum Production.

LYDA GORDON SHIVERS. Social Welfare Organizations in the South.

STANLEY STEVENS. Health Organizations in the South.

EDITH WEBB. Agricultural Classes in the South, Particularly the Middle-class Farmer.

N. C. YOUNG. Child Welfare Institutions and Agencies.

PROFESSOR ODUM has also initiated and set up the organization for the Tennessee Valley Study as a special phase of the Southern Regional Study.

With KATHARINE JOCHER and others, he is continuing the studies of regional and folk sociology.

During the year, PROFESSOR ODUM has edited for the American Social Science series published by Henry Holt and Co.:

Marriage. By Ernest R. Groves.

Industry and Society. By Arthur James Todd.

PROFESSOR ODUM has also edited Volume XI of *Social Forces.*

HAROLD D. MEYER, with the Recreation Committee of the North Carolina Conference for Social Service, made a study of Recreational

Activities and Programs for the Unemployed in the State of North Carolina.

Professor Meyer, as Chairman of the Research Committee of the North Carolina Congress of Parents and Teachers, directed a study of the Conditions in the State Affecting the Public School System and Recent School Legislation. A report of this work is in the *North Carolina Parent-Teacher Bulletin* for September, October, and November, 1932.

Wiley B. Sanders directed the Rosenwald study of Negro Child Welfare in North Carolina, shortly to appear from the University of North Carolina Press.

In this study are included a critical survey of the Negro child-caring institutions; a statistical analysis of 23,000 county juvenile court records in North Carolina, 1919-1929; a study of children in the state's prison, case records of delinquent Negro children, the Negro unmarried mother, health work for Negro children, and Rosenwald schools.

Professor Sanders has also collaborated with George H. Lawrence on a book to be entitled Rural Social Case Records.

This study will include a group of twenty records of rural cases in Orange County, North Carolina, covering such public welfare programs as mothers' aid, child placing, juvenile delinquency, mental defectiveness, illegitimacy, mixed parentage, etc., and written in such form as will be of assistance in teaching the technique of social case work.

L. M. Brooks has published:

The Relation of Spatial Isolation to Psychosis. *The Journal of Abnormal and Social Psychology,* XXVIII: 4. 1933.

Five Years of "Planning" Literature. *Social Forces,* XI: 3. 1933. (With Evelyn C. Brooks.)

Professor Brooks has in progress:

Further study of parental attitudes and problems connected with the adoption of young children; an extension of research introduced through the master's thesis of Jacqueline Johnson.

Continued study of primary group isolation.

Early completion of a study in racial-social distance. For reports of the research activities of the following, see section entitled "Institute for Research in Social Science," pp. 81-85:

Ernest R. Groves. Marriage, the history and conservation of the family, social psychiatry.

T. J. WOOFTER, JR. Races and ethnic groups in the United States, population problems of the South, subregions of the Southeast, the Tennessee Valley Study, statistical techniques.

GUY B. JOHNSON. Studies of the Negro and of the North Carolina Indians, the effects of the depression upon the Negro in North Carolina.

RUPERT B. VANCE. Human geography of the South, political leadership and folk society in the South, southern geographic backgrounds and submarginal groups.

PROFESSOR VANCE is directing the following research:

WINNIE LEACH DUNCAN. (Progress on doctoral dissertation.) The Social Theory of George Fitzhugh, Sociologist of the Old South.

The following master's theses were completed during the year under the supervision of the Department:

VIRGINIA KLUTTZ CRAWFORD. A Study of Southern Opinion on the Negro. (Under the direction of GUY B. JOHNSON.)

By means of questionnaires centering around the problems of Negro racial abilities, segregation, the ballot, and race mixing, this study attempts to measure the opinions of white and Negro college students on important phases of the race problem.

JOSEPH HERMAN JOHNSON. West Southern Pines, an Episode in Negro Self-Government. (Under the direction of GUY B. JOHNSON.)

A part of the Negro section of Southern Pines, N. C., was incorporated as a Negro municipality in 1923. In 1931 the town charter was revoked and the town was absorbed by Southern Pines. This study describes the operation of the Negro town, its attempts at law enforcement, its tax problems, its politics, its civic improvements, etc., and analyzes the factors responsible for the loss of the town charter.

JACQUELINE VAN RADEN JOHNSON. A Study of Attitudes and Problems Connected with the Adoption of Young Children. (Under the direction of LEE M. BROOKS.)

From the point of view of forty literate families, a few of the suggestive assumptions derived from this preliminary, first-hand study are as follows: the biological-psychological-sociological risks are no greater than with "own" children; parenthood is basically "habit" rather than "instinct" above the organic level; so-called illegitimacy *per se* is of little or no importance; the fact of adoption must not be concealed from the child by his foster parents.

LESSIE OPHELIA TOLER. The Negro and Communism. (Under the direction of GUY B. JOHNSON.)

This study is based upon the history of the Negro and organized labor in the United States, the activities of radical organizations among Negroes in this country, and the attitudes which certain groups of Negroes have toward Communism. The discriminating policies and practices of white labor groups toward the Negro have been emphasized in the appeals of radical organizations attempting to enlist the Negro. The Communist party emphasizes all forms of racial discrimination in its efforts to secure Negro converts. A questionnaire of relevant statements provided with a scale for the measurement of attitudes of agreement, neutral, and disagreement was sent to groups, both random and selected, of Negro professional and business men and women in thirty-one states and students in three southern Negro colleges. The attitudes of a group of white students in a southern university were secured to be used as a gauge for comparison. A comparison of the relative conservatism of certain groups was made by contrasting the returns by geographic location, profession, etc., with the attitudes of the white group. The conclusions are based upon the opinions of 254 Negroes. The statistical data support the following conclusions: (1) a majority of Negroes believe that racial prejudice in the United States makes the Negro a fertile field for the sowing of Communistic propaganda; (2) Negroes doubt that Communism would eradicate racial prejudice; (3) Negroes do not express pro-Communism to a great extent on statements that would serve well to reveal such an attitude; (4) Negro ministers, northern Negroes, and Negro leaders express opinions that may be summarized as being more conservative than those expressed by southern Negroes and Negro students.

DEPARTMENT OF ZOÖLOGY

H. V. Wilson and Irene Boliek. Degeneration Phenomena in Sponge Larvae. Read before the North Carolina Academy of Science, May 5, 1933. (To be printed in the *Journal of the Elisha Mitchell Scientific Society.*)

Ezda Deviney, in residence during the summer, is continuing work on her dissertation, A Comparison between Budding and Morphallaxis in *Perophora* (Ascidian). (Under the direction of H. V. Wilson.)

Irene Boliek is engaged in an investigation on cellular behavior in the aggregation of sea urchin lymph cells and is carrying on the initial experiments and observations during the summer at the Beaufort (N. C.) laboratory of the U. S. Bureau of Fisheries.

R. E. Coker has published during the year:

Arrêt du Développement chez les Copépodes. *Bulletin Biologique de la France et de la Belgique,* LXVII: 2: 276-287. 1933.

With an undescribed species of copepod found at Chapel Hill, development under ordinary laboratory conditions always ceased at the fourth copepodid

stage (ninth or tenth larval stage). Arrest of development in that stage, continuing for very long periods—periods many times as long as the whole period of development of nearly related copepods with which they were associated—was not accompanied by diminution of activity nor, as the result showed, by loss of the potentiality of further development. During the period of arrest the copepods are broadly tolerant with respect to temperature, living with seemingly unimpaired vitality at temperatures at least as low as 7° C. and at least as high as 32° C.; but continued development through the two additional molts preliminary to maturity was induced only by subjecting the animals to low temperatures. The copepod seems to offer a very unusual sort of combination of eurythermy and stenothermy displayed in different phases of development.

C. D. BEERS has published:

Diet in Relation to Depression and Recovery in the Ciliate *Didinium nasutum*. *Archiv für Protistenkunde,* LXXIX: 101-118. 1933.

This study deals with the production of depressions in pure lines of *Didinium nasutum* and with the capacity of the lines to recover from such depressions. Depression was induced by culturing the animals on starved paramecia. The symptoms of depression included a decrease in fission rate, an increase in death rate, and the production of structural abnormalities. Control lines which were cultured on well-fed paramecia showed no depression. The depressed animals, when restored in the last stages of depression to a diet of well-fed paramecia, showed a strikingly rapid recovery. Hence this type of depression, unlike certain other types of depression induced in related forms by similar cultural inadequacies, was not inherited after the restoration of the depressed animals to an adequate diet. Certain of the abnormalities were indicative of an axial gradient in the metabolic activities along the longitudinal axis.

The Ingestion of Large Amebae by the Ciliate *Frontonia leucas*. *Journal of the Elisha Mitchell Scientific Society,* XLVIII: 223-227. 1933.

The ciliate *Frontonia* occasionally feeds on large unattached, monopodal Amebae. It is suggested that phenomena of solation, gelation, and cytoplasmic contraction may be of greater importance in the mechanics of ingestion than has been formerly believed.

The following master's thesis was completed during the year under the guidance of the Department:

IRENE BOLIEK. Some Points in the Development of the Eye in Fishes and Amphibia. (Under the direction of H. V. WILSON.)

In *Chorophilus* the optic rudiments are traced from their earliest appearance as two antero-lateral depressions in the open medullary plate through the phases of the involution and fusion of the neural folds; the evagination and later invagination of the optic vesicles to form optic cups; and the later differentiation of the walls of the optic cups. The lens-forming ectoderm thickens

at a point opposite the invaginating wall of the optic vesicle, pulls away from the overlying superficial ectoderm, and constricts off as a lens vesicle containing a lumen. The walls of the lens vesicle thus formed differentiate into lens fibers and lens epithelium.

In *Cod* embryos the lens has its origin in a down-growth of sensory ectoderm in the space between the distal wall of the still solid optic sacs and the periblast. The columnar cells of the proximal wall of this down-growing open invagination give rise to the lens vesicle; the flattened cells of the distal wall disappear, taking no part in lens formation.

Evidence from experimental embryology is such as to indicate that there is no localized area of ectoderm destined for lens formation, and that lens formation normally occurs in response to a stimulus proceeding from the optic cup. As to the exact nature of this stimulus investigators are in doubt.

INSTITUTE FOR RESEARCH IN SOCIAL SCIENCE

Substantial grants from the Laura Spelman Rockefeller Memorial and the Rockefeller Foundation made to the University of North Carolina, for the study of problems in the social sciences arising out of state and regional conditions, led to the establishment in 1924 of an Institute for Research in Social Science. The work of the Institute represents, therefore, a specific program of regional social research, study, and interpretation, with studies in local government, southern historical backgrounds, socio-economic activities (including studies in social-industrial relationships), crime and criminal justice, the Negro, folklore and folk backgrounds of the southern people, social institutions, public welfare and child welfare, and human geography of the American South. While chosen for the most part from the state and regional field, research projects are selected with a view to their generic value and for their possible contribution in both method and content.*

The Institute, in coöperation with the University of North Carolina Press, published during the year:**

*Human Geography of the South.**** A Study of Regional Resources and Human Adequacy. By Rupert B. Vance.

For a report of the research activities of Howard W. Odum in social trends, the Southern Regional Study: the South's Capacity for Social

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* For a further statement regarding the establishment and the purposes of the Institute, see *Research in Progress*, 1928-1929, pp. 95-96.

** The book list from 1924-1929 is found in *Research in Progress*, 1928-1929, pp. 96-97; 1929-1930, p. 80; 1930-1931, p. 89; 1931-1932, p. 90.

*** Awarded the Mayflower Cup for the year 1933.

and Educational Development, the Tennessee Valley Study, and studies of regional and folk sociology, see section entitled "Department of Sociology," pp. 75-76.

ERNEST R. GROVES has published during the year:

Marriage. New York: Henry Holt and Company. 1932.

History of the Family for 1932. *American Journal of Sociology,* XXXVIII: 6: 873-879. 1933.

The Development of Social Psychiatry. *Publications of the American Sociological Society,* XXVII: 2:143-144. 1933.

PROFESSOR GROVES, in collaboration with GLADYS HOAGLAND GROVES, has completed the studies of Sex in Childhood. The manuscript is now in press and will be published shortly by the Macaulay Company.

PROFESSOR GROVES has in progress a study of the problems and conservation of the American family to be published by the Lippincott Company as a completely revised and enlarged edition of *Social Problems of the Family.*

T. J. WOOFTER, JR., has published the following:

The Status of Racial and Ethnic Groups. Chapter XI in Vol. I of *Recent Social Trends in the United States.* Report of the President's Research Committee on Social Trends. 2 vols. New York: McGraw-Hill. 1933.

A Reclassification of Urban-rural Population. *Social Forces,* XI: 348-351. 1933. (In collaboration with EDITH WEBB.)

Common Errors in Sampling. *Social Forces,* XI: 521-525. 1933.

DR. WOOFTER has completed his monograph on the status of Races and Ethnic Groups in American Life for the President's Research Committee on Social Trends. The manuscript is in press and the book will be released shortly by the McGraw-Hill Book Company.

In connection with The Southern Regional Study, DR. WOOFTER has carried on special researches in population problems in the South and has worked out, on the basis of socio-economic characteristics, a division of the Southeast into 27 subregions which are more homogeneous than the states.

DR. WOOFTER is in charge of research in the Tennessee Valley Study under the Southern Regional Study.

Clarence Heer has published during the year:

Taxation and Public Finance. Chapter XXVI in Vol. II of *Recent Social Trends in the United States.* Report of the President's Research Committee on Social Trends. 2 vols. New York: McGraw-Hill. 1933.

Trends in Taxation, Public Expenditure, and Public Indebtedness; Taxation of Public Service Corporations; Sales Taxes. Part II in *Report of the Tax Commission* of North Carolina, 1932, to Governor O. Max Gardner. (With the assistance of Hugh P. Brinton and Robin Hood.)

The Elimination of Tax Conflicts. A preliminary canvass of suggested plans of action. Memorandum submitted to Interstate Commission on Conflicting Taxation of the Interstate Assembly (mimeographed).

Comparative Costs of County Government in the South. *Social Forces,* XI: 263-268. 1932.

The Interstate Commission on Conflicting Taxation. *The Tax Magazine,* June, 1933.

Dr. Heer has edited Tax Collections in the United States in the 1933 edition of *Federal and State Tax Systems.* Commerce Clearing House.

He served as consultant and research director for the Tax Commission of North Carolina, 1932.

As research director of the Interstate Commission on Conflicting Taxation of the Interstate Assembly, Dr. Heer is engaged in studies of methods of securing better coördination between federal and state taxing systems.

Harriet L. Herring has completed for the Southern Regional Study the special researches in southern industry in comparison with other sections of the country.

Miss Herring has prepared a chapter on the Southern Industrial Worker for a symposium, Culture in the South, to be published by the University of North Carolina Press.

Miss Herring is completing her history of the textile industry in the South. The manuscript will go to press shortly.

As a part of the Tennessee Valley Study of the Southern Regional Study, Miss Herring is undertaking researches in industrial legislation.

KATHARINE JOCHER has published during the year:

A Challenge to the Social Sciences. *Social Forces,* XI: 303-305. 1932.

The Third White House Conference. *Social Forces,* XI: 602-604. 1933.

DR. JOCHER has been making a study of the South's representation in national groups and committees, in connection with the Southern Regional Study.

With HOWARD W. ODUM, DR. JOCHER is continuing the studies of regional and folk sociology.

GUY B. JOHNSON has completed a study entitled The Negro and the Depression in North Carolina.

This study attempts to describe the effects of the depression on the economic condition of the Negro, on education, health, illegitimacy, crime, and race relations. It is a part of the larger Institute coöperative study, A State in Depression. A summary of Dr. Johnson's researches will appear shortly in *Social Forces.*

DR. JOHNSON has continued work on the Negro and Radicalism, and on the North Carolina Indians as reported in *Research in Progress,* 1931-32.

DR. JOHNSON has prepared a chapter on Negro Folk Songs for a symposium, Culture in the South, to be published by the University of North Carolina Press.

He has in preparation a study of The Development of Negro Social Institutions in the South.

The following master's theses were completed under DR. JOHNSON'S direction during the year:

VIRGINIA KLUTTZ CRAWFORD. A Study of Southern Opinion on the Negro. (See Department of Sociology.)

JOSEPH HERMAN JOHNSON. West Southern Pines, an Episode in Negro Self-Government. (See Department of Sociology.)

LESSIE OPHELIA TOLER. The Negro and Communism. (See Department of Sociology.)

GUION GRIFFIS JOHNSON has published during the year:

Revival Movements in Ante-bellum North Carolina. *The North Carolina Historical Review,* X: 21-43. 1933.

The Camp Meeting in Ante-bellum North Carolina. *The North Carolina Historical Review,* X: 95-110. 1933.

Dr. Johnson is completing her social history of ante-bellum North Carolina.

She has under way a social history of the ante-bellum South.

Rupert B. Vance has published during the year:

Human Geography of the South. A Study of Regional Resources and Human Adequacy. Chapel Hill: University of North Carolina Press. 1932.

Dr. Vance has completed, in collaboration with Waller Wynne, Jr., a study of the so-called unwritten law defense in relation to folk attitudes. The manuscript has been accepted for publication in the *American Journal of Sociology.*

Dr. Vance is continuing his researches on:

1. His projected volume: Statesmen and Spellbinders of the New South, 1880-1930. A study of political leadership in relation to the folk society.

2. A theoretical synthesis of the fields of human geography and environmental sociology.

3. Special studies of southern geographic backgrounds and submarginal areas for the Southern Regional Study and the Tennessee Valley Study.

Julia C. Spruill is completing her study of The Southern Woman in the Colonies.

Columbus Andrews, under the direction of Howard W. Odum, has been collecting, assembling, and tabulating data on A State in Depression, with special reference to education, public welfare, and public finance.

Robin Hood, under the direction of H. D. Wolf, has continued his compilation of a select, critical bibliography on southern labor since 1893.

Waller Wynne, Jr., has completed, in collaboration with Rupert B. Vance, a study of the so-called unwritten law defense in relation to folk attitudes. The manuscript has been accepted for publication in the *American Journal of Sociology.*

Under the direction of Howard W. Odum, Mr. Wynne has been preparing for A State in Depression, the Southern Regional Study, and the Tennessee Valley Study, statistical compilations, maps, and charts of the socio-economic and educational characteristics and resources of the South in its relation to other regions in the United States.

RESEARCH ORGANIZATIONS

PROCEEDINGS OF THE ELISHA MITCHELL SCIENTIFIC SOCIETY

338th Meeting, October 11, 1932

W. C. Coker. The Opportunities for Botanical Study at the Highlands Laboratory.

In 1931 at Highlands, N. C., a compact and well-built laboratory was completed and opened for the use of students of natural history. In August of that year it was dedicated as the Weyman Memorial Laboratory. It is the property of a corporation known as the Highlands Museum and Biological Laboratory. The building has all conveniences such as water, lights, individual work rooms and one large central room, dark room for photographic work, drying apparatus for plants. The building is situated in the woods on the edge of a lake about 7 acres in extent, which is owned by the corporation. They own also about 10 acres of land surrounding the lake. The building is intended for the use of professors and students engaged in research in any of the natural history subjects. There is no class instruction yet carried on there.

The laboratory is ideally situated for the study of mountain life. The elevation of the building is about 3,800 feet, and arising immediately around it are mountains with elevations of about 4,500 feet to over 5,000 feet. The highest Appalachians are in easy reach by good roads. The forests on the mountain sides and in the coves are not surpassed, if equalled, by any others in the eastern United States, very large areas being primeval and containing the largest known specimens of several kinds of trees, as birch and hemlock. These magnificent forests offer unsurpassed opportunities for botanizing in any phase of the subject. They are wonderfully rich in fungi of all sorts and present in profusion the beautiful and varied flora of our mountains. In addition to the laboratory lake, there are other lakes in and near the town and these have been pronounced unusually rich in aquatic life, both animal and plant. In a congenial environment and delightful climate, the student will find at Highlands both equipment and material for original investigation.

Sherwood Githens. The Magnetic Field of a Solenoid Oscillating at Radio Frequencies.

For abstract see p. 64.

339th Meeting, November 8, 1932

J. B. Bullitt. A Comparison of Several Human Species. (Exhibit.)

A. S. Wheeler and J. H. Waterman. Cymyl Orange: A New Indicator.

Aminocymene was covered into its sulfate; salt was dehydrated and sulfonated with fuming sulfuric acid at 165°. The purified sulfonic acid was diazotized and coupled with dimethylanilin. The orange colored dye produced is an indicator. Its formula is $CH_3 \cdot C_3H_7 \cdot SO_2OH \cdot C_6H_2N_2C_6H_4N(CH_3)_2$. It is crystalline, orange colored, and a better indicator than the well-known and much used methyl orange. The superiority is due to the fact that the two colors obtained with methyl orange in acid and alkaline solutions show a distinct brown tone, whereas cymyl orange gives a pure yellow and pure pink.

340TH MEETING, DECEMBER 13, 1932

H. N. JENKS. Environmental Influences of the Water-Sewage Cycle. (Lantern.)

H. V. WILSON. Adaptive Behavior of Sponges in Making a Skeleton.

A Suberites from Chesapeake Bay, recorded as *S. paradoxus* Wilson but perhaps representing only a phaenotypical variation of a known species, ekes out its spicular skeleton with sand grains which are incorporated in outgrowths extending down into the substratum on which the lamellate body rests. An approach is thus made to the condition present in Phoriosponga and Keratose genera. *Stylotella heliophila* in parts of the Beaufort (N.C.) harbor spreads out in thin sheets over a sandy bottom, its attachment to which is accomplished by the incorporation of sand grains instead of by the formation of spicular root-bundles as in some other sponges. This utilization of ready-made bodies with a consequent saving of energy in the process of skeleton formation is far more strikingly illustrated in the two cases on which Professor E. Topsent of Strasbourg has recently published (*Arch. de Zool. Expér. et Gén.*, 68, Notes et Revue: 19). Topsent finds that *Acarnus tortilis* when growing on *Geodia cydonium* may use the large projecting oxeas of the latter instead of building up columns of styles. Again *Anomoclathria opuntioides* sometimes grows on and incorporates a filamentous alga, in which case primary skeletal fibres are not formed and the secondary skeleton is arranged with respect to the algal branches as if these were the primary fibres.

Such instances of adaptive alteration of morphogenetic behavior are allied. to what is known as "regulation" of embryogenic processes, and probably at bottom are not far from the "purposive reflexes" of higher animals. We may thus look on them as processes which represent steps in the evolution of that great complex which in the higher animals is referred to as "intelligence."

341ST MEETING, JANUARY 10, 1933

H. D. CROCKFORD. Some Studies in Strong Electrolytes.

1. A mathematical solution of the problem of the calculation of the mean distance of closest approach of the ions in dilute solutions of strong electro-

lytes has been made. This quantity has been obtained as a function of quantities depending on the nature of the individual ions.

2. The activity coefficients of lead chloride in solutions of cadmium nitrate have been determined at different concentrations. These data have been employed to check the equation obtained from the solution in (1).

H. N. DEWICK. The Relative Effectiveness of Visual and Auditory Presentation of Advertising Material.

342ND MEETING, FEBRUARY 14, 1933

W. C. GEORGE. Some Phenomena of Self Adjustment in Ascidians.

Experimental material: *Styela plicata,* a large simple ascidian with thick tough tunic. If either the oral or the atrial opening be closed by tying a string around the siphon, a new opening is formed just below the ligature within about twenty-four hours. Subsequently the characteristic features of the typical siphon are formed about the new opening. The reactions leading to the formation of new openings need not be looked upon as purposive. It appears that the stimulus of the ligature, supplemented probably by deficiency in nutrition and respiration, causes the mantle of the siphon to be pulled loose from its attachments to the siphon tunic and to be withdrawn into the space below the ligature. Here it acts as a nozzle to direct against a spot on the tunic below the ligature the force of the water pressure resulting from further contractions of the mantle musculature. This pressure results in a thinning and a rupture of the tunic at the point where the pressure is applied.

J. A. ALEXANDER. Geo-magnetic Surveying.

The magnetic method of geophysical work deals with variations of the direction and intensity of the earth's magnetic field.

Using an Ascania vertical magnetometer, we measured the vertical component of this field. Scale readings were directly proportional to the vertical field strength. By plotting stations on a map and drawing lines of equal variations from an arbitrarily chosen base, or by plotting profiles from this base, it was possible to map geologic structures containing different amounts of iron in adjoining areas.

The method proved especially efficient in tracing basic dikes in Triassic sandstone, these being shown by higher readings even where covered by later stream-laid material. Apparently, it is quite suitable to general structural mapping in Triassic areas, the piedmont, and some parts of the coastal plain and may well become a valuable aid to the structural geologist working in these areas.

343RD MEETING, MARCH 7, 1933

J. H. PRATT. Mineralogical Notes on North Carolina Minerals.

Of the one hundred and forty-one manganese minerals that are now recognized, fifteen have thus far been found in North Carolina. Six of these

minerals were unknown in North Carolina until 1931, when the manganese vein or deposit at Bald Mountain, Alleghany County, was opened up. These minerals are alleghanyite and galaxite, new minerals, rhodonite, tephroite, bementite, and neotocite. Another mineral new to North Carolina was also found in this vein: namely, grunerite $(FeMg)SiO_3$, one of the amphiboles. Galaxite belongs to the spinel group. This is the second new mineral from North Carolina to be added to the spinel group, the other being mitchellite, $FeOAl_2O_3 \cdot MgOCr_2O_3 \cdot 2MgOAl_2O_3$.

The spinel group of minerals represented by the general formula $RO \cdot R_2O_3$, where $R = Mg \cdot Fe$, Zn and Mn; and $R_2 = Al$, Fe, Cr, and Mn, is a most interesting group of minerals, and several more members may be expected to be added to this spinel group.

A study of the composition of several of the spinels such as dysluite, a variety of gahnite, $(Zn \cdot Fe \cdot Mn \cdot)O \cdot (Al \cdot Fe)_2O_3$, of franklinite, $Fe \cdot Zn, Mn)O \cdot (Fe, Mn)_2O_3$, of jacobsite, $(Mn, Mg)O \cdot (FeMn)_2O_3$, and of picotite $(Mg, Fe)O \cdot (Al, Fe, Cr)_2O_3$, indicates that there are several spinel molecules occurring in combination which thus far have not been found in nature such as $MgO \cdot Fe_2O_3$; $MgO \cdot Mn_2O_3$; $MgO \cdot Cr_2O_3$; $ZnO \cdot Fe_2O_3$; $ZnO \cdot Mn_2O_3$; $FeO \cdot Mn_2O_3$, and $MnO \cdot Mn_2O_3$. Some of these will undoubtedly be found as minerals. The $MgO \cdot Cr_2O_3$ molecule forms a considerable percentage of the composition of the spinel, mitchellite.

There are 55 minerals classified as uranium minerals, of which ten have thus far been found in North Carolina. Of these phosphuranylite and clarkeite were first identified in this state. Clarkeite has been formed from the alteration of uraninite. This mineral was formerly supposed to be gummite, which was considered the first alteration product of the uraninite. Now the series is shown to be from uraninite through clarkeite, gummite, to uranophane.

During the summer of 1932 very beautiful crystals of torbernite were found at one of the feldspar mines near Spruce Pine. These are flat, tetragonal crystals from one to four mm. wide, with the basal plane very prominent, and the prism $a(100)$ slightly developed as are also two pyramids, probably $x(105)$ and $y(102)$.

W. DEB. MACNIDER. The Response of the Liver to Large Amounts of Ethyl Alcohol. (Lantern.)

344TH MEETING, APRIL 11, 1933

T. F. HICKERSON. Continuous Beams with Variable Sections.

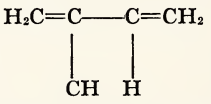
The development of a general slope-deflection formula giving the bending moment to which engineering structural members of variable section are subjected when loaded transversely in any manner and restrained unsymmetrically at terminals that may, or may not, be on the same level.

It was shown how this general formula merges into the well-known slope-deflection formula for the special case of members with constant section.

B. L. JOHNSON. A Study of the Aging of Rubber.

The research discussed was one concerning the physical and chemical changes which take place when the rubber is aged. By the aging of rubber is meant its deterioration; for example, increase in tackiness, loss of tensile strength, and its finally becoming cracked and brittle.

The structure of rubber itself suggests several theories as to the mechanism of its aging. The more important ones were discussed. Rubber is composed of polymers of isoprene which has the formula



One theory of deterioration is that oxygen attacks the rubber by addition at the double bond.

Another method of deterioration of the rubber might be a depolymerization or a cleavage in the rubber micelle. The possibilities of this reaction were studied by means of x-ray photographs. The x-ray interferences of crude rubber appear only at a minimum elongation of 80 to 100 per cent. Bary and Hauser have explained the formation of x-ray patterns upon elongation of rubber on the basis that, in the unstretched rubber, crystalline aggregates or fibers exist but are swollen by the lower polymers so that it is impossible for them to give a diffraction pattern. When the rubber is rapidly stretched, the lower polymers are expelled leaving the regularly oriented crystalline aggregates which produce the x-ray diffraction pattern. From this view, the fact that as the time of oven aging is increased the elongation necessary to produce an x-ray pattern of rubber must be increased may be interpreted as meaning that there had been a depolymerization and the greater elongation was required because the concentration of lower polymers to be expelled had been increased during aging. However, this work indicates that there is the same amount of depolymerization in both the rubber with and without anti-oxidant. This indicates that other factors (perhaps oxidation) than the shift to the polymers of the lower type caused the greater decrease in tensile strength found in the case of the anti-oxidant free rubber.

The fact that the position and width of the diffraction lines stays the same at various elongations indicates that the decrease in intensity of the diffraction lines upon aging is due to the smaller number of crystal aggregates or micelles and not to a variation in the size of a constant number of micelles.

345TH MEETING, MAY 9, 1933

E. T. BROWNE. An Unsolved Problem in Mathematics.

COLLIER COBB. North Carolina Granites in Art.

THE PHILOLOGICAL CLUB

November 9, 1932

Dougald MacMillan. David Garrick as a Critic.

An examination of the critical utterances of David Garrick, found scattered throughout his published correspondence and his numerous prologues and epilogues, and occasionally found in his other works, reveals a not unexpected discrepancy between his expressed opinions and his practice. He cherished vague ideas as to the ethical purpose of drama and the elevated functions of criticism; though he vigorously opposed in theory the popularity of opera, spectacle, and pantomime, he produced them frequently; objecting to the rise of sentimental comedy, he at the same time approved individual examples of the species; and though he rejoiced in his reputation as the restorer of Shakespeare, he acted in many apocryphal versions of the plays and adapted the bard to his own uses. Finally, in passing judgment upon plays submitted to him for production, he seems to have been actuated solely by the prospects of theatrical success.

December 6, 1932

W. L. Wiley. Translation of Ovid in the French Renaissance.

This paper seeks to indicate the most important translations of Ovid during the sixteenth century in France. It also tries to point out the change of attitude that took place with regard to translations around 1550, when the Pléiade stressed the interpretation of the spirit of the Ancients rather than literal renditions of their works. Especial attention is paid to Pierre Le Loyer's version of the *Ars Amatoria,* which illustrates perfectly the theories of the Pléiade.

January 10, 1933

George R. Coffman. Old Age from Horace to Chaucer: Some Literary Affinities and Adventures of an Idea.

This paper developed two essentially related elements. The first concerned the protean quality of a striking description of old age as it passed from Horace into the hands of a selected group of medievalists. In its relation to the reading, the temperament, the observations of the authors or compilers, or to the dominant mood and prevailing intellectual doctrines of the period, this description forms an interesting chapter in the history of medieval culture. The second element in this study concerned the possible relation of this idea in some of its protean changes to Chaucer in one of his creative moments.

February 8, 1933

Arthur P. Hudson. The Bell Witch of Tennessee and Mississippi: A Folk Legend.

The legend, the subject of this paper, gathered from traditional sources among the white people of northern Mississippi, recounts the misfortunes of

a family by the name of Bell who moved from North Carolina to Tennessee early in the nineteenth century and then, in one branch, to northern Mississippi about forty years later. The father of the family kills his plantation overseer and is forced by the avenging spirit of the overseer to move to Tennessee. There the avenging spirit, known as the Witch, centers attention upon the daughter of the family, pursues the family in a second move to Mississippi, declares its love for her, and finally tortures her to death. This tale is compared with printed versions gathered in Tennessee and, in most of its motives, with analogous traits in European folk-tales. The study shows the comparative independence of the Mississippi oral version and its tendency to become a vampire tale.

MARCH 7, 1933

URBAN T. HOLMES, JR. Gem Stones of the Middle Ages and Renaissance.

APRIL 4, 1933

H. R. HUSE. The Philosophy of Anatole France.

MAY 2, 1933

G. C. TAYLOR. The Modernity of Shakespeare.

SOCIETY OF THE SIGMA XI

During the year the following were the principal activities of the North Carolina Chapter of the Society of the Sigma Xi:

The first meeting was addressed by Dr. Archibald Henderson on modern theories of the age of the earth and an expanding universe.

The second was a joint meeting with the Duke University chapter for a guided tour of instruction through their medical building and hospital.

The annual lectures were delivered on two consecutive evenings by Dr. Charles R. Stockard, of the Cornell University Medical College, on the general subject of genetics. They were profusely illustrated by slides showing the results of his researches at his kennels near New York City.

The final meeting was addressed by the retiring president of the Chapter, Dr. A. S. Wheeler, on The Carbon Atom.

During the year three members were advanced from associate to full membership, two others were elected to full membership, one of these being an alumnus, and twelve were elected to associate membership.

RESEARCH PUBLICATIONS

JOURNAL OF THE ELISHA MITCHELL SCIENTIFIC SOCIETY

Volume XLVIII, 1—October, 1932

Proceedings of the North Carolina Academy of Science.

Proceedings of the Elisha Mitchell Scientific Society.

William Willard Ashe.

Mary Frances Seymour.

On a Collection of Fishes from the Tuckaseegee and Upper Catawba River Basins, N. C., with a Description of a New Darter. *Samuel F. Hildebrand.*

Absorption of Water by the Leaves of Common Mesophytes. *Harold F. Williams.*

The Seed Development in *Pinus palustris. A. C. Mathews.*

Pedestal Rocks of Granite in the Southern Piedmont. *Julian J. Petty.*

Some Preliminary Notes of the Ecology of the Upland Communities in the Vicinity of Greensboro. *Earl H. Hall.*

The Effect of Various Chemicals on the Larva and Pupa of *Cules pipiens* at Various Temperatures. *B. J. Baroody.*

Causes and Prevention of Corrosion in Gas Mains. *E. E. Randolph* and *J. M. Morrow.*

Microchemical Studies of the Changes during Vernal Activity in *Ginkgo biloba. Ruth Scholz.*

Notes on Extended Ranges of Plants in North Carolina. *W. C. Coker* and *H. R. Totten.*

Volume XLVIII, 2—April, 1933

Mayflies of North Carolina. Part III. *Jay R. Traver.*

Algae of Charlottesville and Vicinity. *Ivey F. Lewis, Conway Zirkle,* and *Ruth Patrick.*

The Ingestion of Large Amebae by the Ciliate *Frontonia leucas. C. Dale Beers.*

A Tree-Frog New to the Atlantic Coastal Plain. *Frances Harper.*

Phthiracarid Mites of Florida. *Arthur Paul Jacot.*

A New Species of Conradina from Tennessee. *H. M. Jennison.*

Fusion between Lymph Balls of a Regular Sea Urchin (Lytechinus) and a Sand Dollar (Mellita). *Rebecca Ward.*

Binary Systems of m-Nitrotoluene and p-Nitrotoluene with Naphthalene, p-Toluidine, and o-Nitrophenol. *H. D. Crockford* and *N. L. Simmons, Jr.*

STUDIES IN PHILOLOGY

VOLUME XXIX, 3—JULY, 1932

The Problem of the Origin of the Griselda Story. *Wirt Armistead Cate.*

The Spenser in John Lane's Chaucer. *Francis W. Emerson.*

Advice to a Son: A Type of Seventeenth Century Conduct Book. *W. Lee Ustick.*

John Dunton and an Imitation of the *Religio Medici. A. C. Howell.*

The Harlot and the Thoughtful Young Man: A Study of the Relation between Rossetti's *Jenny* and Browning's *Fifine at the Fair. William Clyde DeVane.*

Rossetti's "The Blessed Damosel." *K. L. Knickerbocker.*

Recent Publications: Studies in the Seventeenth and Eighteenth Centuries. *Richmond P. Bond* and *Dougald MacMillan.*

VOLUME XXIX, 4—OCTOBER, 1932

The Form of Aelfric's *Lives of the Saints. Dorothy Bethurum.*

Sidney's Political Ideas. *William Dinsmore Briggs.*

The Relation of *Richard III* to the True Tragedy of Richard Duke of York and the Third Part of *Henry VI. Clayton A. Greer.*

The History of the First English Newspaper. *Matthias A. Shaaber.*

The Influence of Godwin on Wordsworth's Letter to the Bishop of Llandaff. *Charles W. Roberts.*

The Spenserian and Miltonic Influence in Wordsworth's *Ode* and *Rainbow. Abbie Findlay Potts.*

Thoreau's Literary Apprenticeship. *Raymond Adams.*

Trends in American Literary Scholarship with Reviews of Some Recent Books. *Gregory Paine.*

VOLUME XXX, 1—JANUARY, 1933

Concilia Deorum from Homer through Milton. *Mason Hammond.*

Parallel or Coincidence? A Problem of Dante Interpretation. *H. D. Austin.*

The York and Towneley Plays on *The Harrowing of Hell. Chester G. Curtiss.*

Elements in the Composition of *King Lear. Madeleine Doran.*

Japan and the *New Atlantis. D. W. Thompson.*

The Sources of Richard Brome's *The Novella. Robert B. Sharpe.*

Exoticism and Heinrich Heine. *Meno Spann.*

The Influence of Contemporary Criticism on George Eliot. *Mathilde Parlett.*

VOLUME XXX, 2—APRIL, 1933

A Mediaeval Commonplace in Spenser's Cosmology. *Rosemond Tuve.*

Notes on Elizabethan Chivalry and *The Faerie Queene. Ivan L. Schulze.*

Spenser's Venus and the Goddess Nature of the *Cantos of Mutabilitie. Josephine Waters Bennett.*

The Concluding Stanzas of *Mutabilitie. Brents Stirling.*

Lamb and Spenser. *J. Milton French.*

Titus Andronicus: Shakespeare at Thirty. *Joseph S. G. Bolton.*

The Realism of Shakespeare's Roman Plays. *John W. Draper.*

Recent Literature of the English Renaissance. *Hardin Craig.*

Italian Renaissance Studies in 1932. *Walter L. Bullock.*

THE NORTH CAROLINA LAW REVIEW

VOLUME XI, 1—DECEMBER, 1932

Proposals for Legislation in North Carolina. *Members of the Law School Faculty.*

VOLUME XI, 2—FEBRUARY, 1933

The Proposed Constitution and Special, Private, and Local Legislation in North Carolina. *Frank P. Spruill.*

Nationalism of Swift v. Tyson. *J. S. Waterman.*

VOLUME XI, 4—JUNE, 1933

A New Intestate Succession Statute for North Carolina. *Fred B. McCall* and *Allen W. Langston.*

A Survey of Statutory Changes in North Carolina in 1933. *Members of the Law School Faculty.*

SOCIAL FORCES

VOLUME XI, 1—OCTOBER, 1932

The Concept of Distribution and Succession in Social Ecology. *Radhakamal Mukerjee.*

Saint-Simon and America. *J. F. Normano.*

The Changing Background of Southern Politics. *H. Clarence Nixon.*

The Comparable Interests of the Old Moral Philosophy and the Modern Social Sciences. *Gladys Bryson.*

Critical Notes on the Nature of Sociology as a Science. *James W. Woodard.*

Fourteen other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME XI, 2—DECEMBER, 1932

Sociology in America: Impressions of a Visitor. *Richard Thurnwald.*

The Nature and Scope of Sociology. *Theodore Abel.*

The Possibility, Character, and Functions of Applied Sociology. *Henry Pratt Fairchild.*

Applied Sociology and Major Social Problems. *James H. S. Bossard.*

The Relation of Applied Sociology to Social Work. *Neva R. Deardorff.*

Fifteen other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME XI, 3—MARCH, 1933

The Social Wisdom of the Primitives with Special Reference to Their Proverbs. *J. O. Hertzler.*

Vicinal Isolation and Mental Immobility. *Howard Becker.*

Sociology in England. *Ernest Bouldin Harper.*

Voluntary Social Services in London Schools. *Robert E. Chaddock.*

Five Years of "Planning" Literature. *Evelyn C. Brooks* and *Lee M. Brooks.*

Fourteen other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

VOLUME XI, 4—MAY, 1933

Notes on Recent Trends in the Application of the Social Sciences. *Howard W. Odum.*

A Century of Progress in the Social Sciences. *L. L.* and *J. S. Bernard.*

Limitations to the Application of Social Science Implied in Recent Social Trends. *Charles A. Beard.*

Statistics in Relation to Social Trends in the United States. *Stuart A. Rice* and *Florence DuBois.*

Trends in the Study of Local Areas: Social Surveys. *Shelby M. Harrison.*

Trends in Housing. *James Ford.*

The Third White House Conference. *Katharine Jocher.*

Eleven other articles in the departments of Teaching and Research in the Social Sciences; Public Welfare and Social Work; Community and Neighborhood; Marriage and the Family; Race, Cultural Groups, Social Differentiation; Government, Politics, Citizenship; Social Industrial Relationships.

THE UNIVERSITY NEWS LETTER

Feature Articles

The Task of Popular Government. Two issues.
Farm Income in North Carolina.
The County Consolidation Movement in the United States.
Farm Property in the United States.
Value of Farm Land and Buildings in North Carolina.
Reading Newspapers in North Carolina.
Public Libraries in North Carolina.
Industry and Agriculture in North Carolina.
Income Taxpayers in North Carolina.
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Property Tax Reductions in North Carolina.
County Consolidation; The Executive Veto.
Farm Income in the United States.
Public Education in North Carolina.
Taxation in North Carolina.
Public Expenditures in North Carolina.
Federal Relief in North Carolina.
E. C. Branson and His Work. A Summary of Graduate Research conducted by Dr. Branson and his departmental staff, 1914-1933.
Charities, Corrections, and Public Welfare in North Carolina.
Cost of County Government in North Carolina. Two issues.
Criminal Cases in North Carolina, 1930-1932.

Part II

FACULTY PUBLICATIONS

N. B. Adams. *Spanish Review Grammar and Composition.* New York: Henry Holt & Co. 1933.

Raymond Adams. Henry Thoreau, July 12, 1817. *The Concord Journal,* July 8, 1932. Two Chapters in Southern Religious Liberalism. *The Christian Leader,* June 24, 1933. Also delivered as the historical address at the Seventh Annual Historical Meeting of the North Carolina Universalist Convention, Kenansville, June 4, 1933.

Susan G. Akers. Simple Library Cataloging. Second edition rewritten. To be published by American Library Association, Chicago, 1933.

L. M. Brooks. *Workbook in Sociology,* Form A. New York: Longmans, Green & Co. 1932.

E. T. Browne. *Introductory Mathematics.* New York: McGraw-Hill Book Company. 1933. (In collaboration with J. W. Lasley, Jr.) On the Classification of Collineations in the Plane. To appear in an early issue of *The American Mathematical Monthly.*

Preston C. Farrar. Methods of Rating Compositions. *High School Journal,* October and November, 1932. The Criticism of Compositions. *High School Journal,* January and March, 1933. The Bearing of Grammar on the Teaching of Composition. *High School Journal,* April, 1933.

Wirth F. Ferger. Book Reviews: *Les Principes de la Méthode Statistique,* by Lucien March. *Journal of the American Statistical Association,* XXVII: 217-220. *Business Statistics,* by John R. Riggleman and Ira N. Frisbee. *Journal of the American Statistical Association,* XXVII: 457-8.

Ernest R. Groves. Beauty and the Child's Community. *Child Welfare Magazine.* Series of articles on parents' problems for the Marshall Hughes Publishing Company.

Harriet L. Herring. Southern Problems in Story. *Social Forces,* XI: 295-298. 1932.

M. A. Hill, Jr. In preparation: Some Theorems of a General Calculus. The development of a general calculus from which the ele-

mentary theorems of the infinitesimal and finite calculus may be derived simultaneously.

S. H. Hobbs, Jr. Taxation in North Carolina. A coöperative volume under the auspices of the North Carolina Club and the North Carolina Conference for Social Service. Fifteen chapters. *University of North Carolina Extension Bulletin,* XII: 4. 1932. Taxation in North Carolina. A general survey of taxation in the state. *University News Letter,* XIX: 4 (entire issue).

Guy B. Johnson. Black and White Again. *Social Forces,* XI: 298-301. 1932. Review of *Lewis Henry Morgan, Social Evolutionist,* by Bernhard J. Stern. *Social Forces,* XI: 151-152. 1932.

Edgar W. Knight. Some Tasks for Teachers and Teaching. *Virginia Teacher,* December, 1932. By Motor from Bagdad to Damascus. *The Baltimore Sun,* September 4, 1932. The World's Newest Government. *The Baltimore Sun,* February 5, 1933. Digging Up the Past. *The High School Journal,* February, 1933. Newest State in the World. *The High School Journal,* January, 1933. Heaven's Blessings Attend Her. *School and Society,* October 15, 1932. Uncovering the Past at Ur. *The Baltimore Sun,* May 7, 1933. The Place of Libraries in the Southern Scene. *Library Extension News,* American Library Association, May 15, 1933. The Minneapolis Meeting. *The High School Journal,* May, 1933.

Frederick H. Koch. Making a Regional Drama. *Bulletin of the American Library Association,* August, 1932. Editor, *The Carolina Play-Book,* the quarterly periodical of the Carolina Playmakers. Editorial articles: A Log-Cabin Theatre. V: 3. 1932. A New Negro Play. V: 4. 1932. Davy Crockett, The Yellowest Flower of the Forest. VI: 1. 1933. Toward an American Folk Drama. VI: 2. 1933. Shaw-Henderson Festival. VI: 2. 1933.

J. W. Lasley. Introductory Mathematics. New York: McGraw-Hill Book Company. 1933. (In collaboration with E. T. Browne.)

Harold D. Meyer. Extra-Curricular Activities for the Modern School. *School Activities,* April, 1933. Recreation Notes for the *North Carolina Parent-Teacher Bulletin,* four issues, 1933.

C. T. Murchison. The Libel against Capitalism. *Virginia Quarterly Review,* April, 1932. The Economist Answers. *Virginia Quarterly Review,* October, 1932. Business Activity and Stock Market Gains. *The Annalist,* September 9, 1932.

HOWARD W. ODUM has collaborated with EDWIN R. EMBREE in the chapter on the social sciences in *Prospecting for Heaven: Some Conversations about Science and the Good Life.* New York: The Viking Press. 1932. New Frontiers of Leadership in Public Affairs in *Public Opinion and the Press,* pp. 52-71. Emory University. March, 1933.

C. E. PRESTON. Excerpts in Methods of Teaching Natural Science by Correspondence. Incorporated in *University Teaching By Mail.* W. S. Bittner and H. F. Mallory, pp. 194-199; 338-339. New York: Macmillan. 1933. According to Season. *High School Journal,* October, 1932. If Teachers Felt Free to Speak. *High School Journal,* October, 1932. The Science Teacher's Opportunity. *High School Journal,* November, 1932. Science Advance in the Elementary Grades. *High School Journal,* November, 1932. Influence of New Scientific Discoveries Upon the Teaching of Secondary School Science. *High School Journal,* December, 1932. A Mount for Lepidophera. *High School Journal,* January, 1933. On Evaluation of New Textbooks. *High School Journal,* February, 1933. Improving Habits of Analysis. *High School Journal,* March, 1933. The Importance of Analyzing Study Activities. *High School Journal,* April, 1933. Overlapping of College and High School Physics and Chemistry Courses. *High School Journal,* May, 1933.

G. T. SCHWENNING. Is the Dismissal Wage a Solution for Technological Unemployment? *Forbes Magazine,* August 1, 1932. This article was reprinted under the title The Dismissal Wage in *Industrial Relations,* September, 1932. Book Review: *Scientific Approach to Labor Problems,* by Adelbert Ford. *Social Forces,* XI: 4. 1933.

SAMUEL SELDEN. A Syllabus of Dramatic Practice. Part I—Acting (mimeographed). The Book Exchange, University of North Carolina, 1933. The Actor's Presence. *The Carolina Playbook,* V: 4. 1932. Book Review of *A Theatre Library,* by Rosamond Gilder. *The Quarterly Journal of Speech,* XIX: 2. 1933.

R. B. SHARPE. A Communication on the Origin of the old Saying, "drunk as a fiddler's bitch." *The American Mercury,* December, 1932.

RUPERT B. VANCE. Sociology Advances Its Right Wing. *Social Forces,* XI: 2: 289-291. 1932. A Science of Settlement. *Social Forces,* XI: 3:465-466. 1933.

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